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PROCEEDINGS
OF THE
ROYAL GEOGRAPHICAL SOCIETY
AND
MONTHLY RECORD OF GEOGRAPHY.



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PROCEEDINGS
OF THE
ROYAL GEOGRAPHICAL SOCIETY
AND MONTHLY RECORD OF GEOGRAPHY.

*Notes of an Overland Journey through the southern part of Formosa,
from Takow to the South Cape, in 1875, with an Introductory
Sketch of the Island.*

By M. BEAZELEY, M. Inst. C.E.

(Read at the Evening Meeting, November 24th, 1884.)

Map, p. 64.

RECENT proceedings at Formosa have prominently directed attention to that island, and invested it with an interest beyond what it has hitherto commanded. With the political part of those proceedings we, as geographers, are happily not concerned; but their probable results to geographical science concern us very nearly, and there can be little doubt that the occupation of the principal ports by one of the great European Powers will sooner or later lead to a more or less systematic exploration of the island. And as even from calamities some good may be extracted if only one knows how to set about it, so this occupation may ultimately produce the beneficial result of increasing our knowledge of the geography, geology, and natural products of, and general acquaintance with, a most inviting and hitherto but little known and almost unexplored region.*

That such a large and important island as Formosa should have remained to the present day so little known is very remarkable; for lying, as it does, like a breakwater off the mainland, right in the traffic between the north and south of China, visited and traded with by the Spanish† and Portuguese in the sixteenth century, actually ceded to and held by the Dutch for some years in the seventeenth, and opened by the Treaty of Tientsin to foreign commerce in 1860, it should by this time

* Mr. Cuthbert Collingwood, M.A., in his 'Rambles of a Naturalist,' says, "The resources of the country are undeveloped, and it yet remains for some enterprising nation to do justice to Formosa."—p. 37.

† The very remarkable red brick fort at Tamsui, and used as an office by H. M. Consulate, is supposed to have been built by the Spaniards in the 16th century.

have been thoroughly explored; whereas we know almost nothing of the interior, the range of mountains, and the east coast.

It is curious that although the mountain range of the northern part of Formosa is distinctly visible from the mainland and islands of the China coast, about 25° N., the Chinese do not seem to have been acquainted with the island until comparatively modern times. Dr. S. Wells Williams in his valuable 'Middle Kingdom' states that "The Chinese had no knowledge of Formosa until A.D. 1403," that is in the early part of the Ming dynasty, and although in the previous or Yuen dynasty there are said to be allusions in the official records to *eastern* barbarians,* which seem to point to the savage inhabitants, the occupants of the Dragon Throne knew so little of, or cared so little for this valuable place, that they ceded the island to the Dutch in 1624 in exchange for the small group of the Pescadores (Ponghou) which the Batavian Government had seized and occupied. The Dutch, who had found the Japanese established at Anping, ousted these latter from the island and fortified themselves in Fort Zelandia, but were finally driven out of Formosa in 1662 by the celebrated piratical chieftain Ching Ching-kung (generally known to us as Coxinga), whose grandson eventually received the pardon and favour of the Chinese Government by making his submission, and handing over the island to their rule.

The island is separated from the mainland by the Formosa Strait, which at its southern end between Breaker Point and the South-west Cape is 245 miles wide, narrowing at the northern end to 62½ miles between Turnabout lighthouse and Pak-sa Point. The nearest point of the mainland is Van-gan at the southern entrance to the Haitan Straits where the distance across is 74 miles to Tong-siau. It extends in longitude from 120° 7½' to 122° ¼' E., and in latitude from 21° 54¼' to 25° 18½' N., and measures from the north point to the South Cape 245 miles. Its greatest width is 76 miles. At the south for the last 30 miles the width suddenly decreases to 13-8 miles, giving the island the appearance on the map of a cleaver with a short handle. The area has been carefully computed from the latest Admiralty chart to be 14,982 square miles.

Formosa is characterised by possessing one of the loftiest mountain ranges in the world. This range extends down the centre of the island like a backbone for the greater part of its length. The uniformity of the elevation of this range is very remarkable, and, although individual peaks are marked on the chart of 11,300, 12,800, and 12,850 feet (and the highest point has not yet been satisfactorily ascertained), there is extremely little inequality in the general outline. I have watched the range day by day for months from the Pescadores, and have always been struck with the extremely level appearance of the crest of the range.

* In the last edition of the 'Encyclopædia Britannica,' art. FORMOSA, vol. ix. p. 417, *Tung-fan* is wrongly translated *southern* barbarians instead of *eastern*.

These mountains are so lofty that they are, during the daytime, always shrouded in mist and clouds, and they are only seen for a very short period just before sunrise and after sunset. At such times the mists have rolled away, and the range then presents a magnificent appearance. It is a very rare thing, even from the plains, for the range to be visible during daylight, and even at sunrise and sunset the whole of the crest is not always in view. These mountains are wooded up to the very top, for, with the aid of a good telescope, I could always, of a clear morning, see the sun rise behind the trees.

Formosa is also characterised by the absence of good harbours. There are only three which at present are made use of by foreign shipping, viz. Tamsui and Kelung at the north end, and Takow at the south-west, and none of these are suitable for vessels of large size. Tamsui is a bar-harbour at the mouth of a river, with only $1\frac{1}{2}$ fathoms on the bar at low water. The springs rise seven to ten feet, and inside, opposite the custom house, there is anchorage in $2\frac{1}{2}$ fathoms, but the holding is extremely difficult during freshets. Kelung is very small, and much exposed during the north-east monsoon. The springs rise three feet, and there is anchorage of five fathoms. Takow has a shifting bar with two fathoms on it. The entrance is dangerous, being only one-third of a cable wide between the rocks. There is a shallow lagoon inside six miles long by about three-quarters of a mile wide, but the anchorage is confined to the outer end, and is very small. There is only one tide a day, and the springs rise from two to three feet. Owing to the size of the lagoon, and the very narrow entrance, the ebb and flow rush through the latter like a sluice, rendering the entering and leaving the harbour a matter of difficulty and some danger. There is a fourth place at which foreign vessels unload and take in cargo, 24 miles north of Takow. This is Anping, the port of the capital of the island, Taiwanfu. But Anping is merely an open roadstead with no shelter in the south-west monsoon; during the four or five months of which no vessels visit the place. The springs rise three feet, and there is almost always a heavy surf on the bar through which passengers are obliged to land, seated in washing-tubs placed on rafts of bamboos. These *tek-pai*, or catamarans as they are called, are managed very skilfully by the boatmen, and accidents seldom occur. There is a small harbour on the east coast, 50 miles south of Kelung, called Sao (Su-ao) Bay, where the springs rise six feet, and where there is good anchorage, and fairly good shelter during the north-east monsoon; but it has not yet been opened to foreign trade.

It is true that the east coast of the island has not yet been explored or surveyed, but from what we do know of it there seems very little prospect of any good port being found there, and it is quite certain that Formosa does not possess any harbour capable of receiving or sheltering vessels of large size.

It is also a remarkable fact that, bad as the present harbours of Formosa are, and inefficient as they prove for commercial purposes, they are not likely to improve, as there can be little doubt that the whole island is rising at rather a rapid rate. During the Dutch occupation in the seventeenth century the capital Taiwanfu was a port, and Fort Zelandia on an island far out to sea. The extensive harbour and bay which then separated the two is now a level plain of many miles in extent, and goods are landed with considerable difficulty, and passengers with great discomfort, at Anping, under the ruins of the old fort. The coast-line, too, of this part has, since the original Admiralty survey was made, extended considerably to the westward, and it is found that the banks off Anping and the Vuloy shoal are rapidly extending. Takow Harbour has long been shoaling, and is now nearly useless as a port.

At the South Cape evidences of the elevation of the shores are very striking in the raised coral beach which fringes the coast; whilst in the north of the island Mr. Cuthbert Collingwood, M.A., in his '*Rambles of a Naturalist*,' pp. 90, 91, thus remark on the shoaling of the port of Kelung:—

"I have little doubt that the harbour of Kelung is slowly rising, though I have not sufficient data to show the rate of elevation. The evidences of this elevation are to be found on both sides of the harbour. Blocks of worn and washed coral strew the beach on the north side, and lie about confusedly at high-water mark in the neighbourhood of Ruin Rock. Similar washed coral blocks lie on the beach between tide-marks on the south side, viz. on Palm Island. The sandstone platform between Palm Island and the mainland, which presents every appearance of having been excavated by the sea slowly forcing a passage through, is now very little below high-water mark; and above the sea-level the sandstone rock bears plain indications of having been washed and worn by the waves where vegetation is now growing. Beyond the present limits of the harbour, the level plain at the back of the town shows that the sea once extended further among the hills; and the inner third of the present harbour is so shallow as to be a mere mud flat at low water."

In the neighbouring group of the Pescadores, however, there are two fine harbours, those of Ponghou and Makung; and it would be absolutely necessary for any foreign Power that wished to settle and hold Formosa to get entire possession of these islands for the sake of the harbours. It is true that the Dutch, who once held the Pescadores, exchanged them for Formosa, but it must be remembered that when they did so the harbour of Taiwanfu (which has now entirely disappeared) was a fine one, quite sufficient for maritime purposes, and that their ships then went up right to the walls of the city.

The Pescadores Islands are not open to foreign trade, and Amoy is at present practically the port of Formosa. The produce is sent in small

vessels to Amoy, from whence it is either transferred to Hong Kong for shipment abroad, or sent direct. The distances from the following places to Amoy are as follows, viz. Kelung, 228 miles; Tamsui, 197 miles; Anping, 147 miles; Takow, 168 miles.

There are no active volcanoes in Formosa, but signs of volcanic action are met with both in the north and south of the island. Near Tamsui there is a boiling spring giving off large quantities of steam, water, and sulphur; and not far from the South Cape there is a spot where inflammable gas is given off, and the ground calcined, as at Pietra Mala in Italy. Earthquakes, too, are common throughout the whole island. I have experienced a pretty smart shock at Anping, sufficient to upset things in the room, whilst at the South Cape they are very frequent, and at times severe.

The object of the journey, of which the following is a narrative, was to visit the South Cape, select a site for the lighthouse to be built there, and obtain the necessary piece of land from the savages for the Chinese Imperial Maritime Customs. The party consisted of Mr. H. O. Brown, the Commissioner of Customs at Takow; Mr. Hastings, Assistant Examiner of Customs; a young Mandarin, secretary to the Tao-tai of Formosa, who had been sent from Taiwanfu to accompany the expedition, and myself. We also took my boy and Mr. Hastings' cook, twenty-two chair coolies for the six chairs, my two chair coolies carrying the instruments, two of the Commissioner's gig-men with eight coolies for the baggage and provisions, and a soldier attending on the Mandarin: in all a party of forty-one. We had at first intended going round to the South Cape by sea in one of the Customs' cruisers, but it was thought risky to do so, as the typhoon season had set in, and there was absolutely no place of shelter to run for in the neighbourhood in case of a blow coming on, so we were compelled therefore to go the whole way overland.

We left Takow early in the morning of June 18th in six native covered chairs, and skirted the lagoon forming the harbour on the sea side. The narrow sandbank separating the lagoon from the sea, and which is six miles long, is composed of black basaltic sand, very fertile, and in places well cultivated. For the first two miles the pathway was so narrow and winding that we kept to the edge of the bank and pushed our way through the mangrove bushes, the bearers being frequently up to their knees in water. In the cultivated parts we passed several excellent fields of indigo, whilst in others the spit was so covered with a dense jungle of screw-pines, mangroves, bamboos, cycads, &c., that it would have been impossible to force our way through. It commenced to rain as we started, and the long roll of the thunder, combined with the dull roar of the surf on the beach outside, sounded very grandly. Several heavy showers occurred whilst we were traversing the lagoon; and every time one came on, the chairs were unceremoniously banged

down on the nearest piece of dry land, and a halt called by the coolies. The jungle through which we passed was so thick that I could only distinguish the Mandarin's soldier, who was just ahead of my chair, by the round white spot on the back of his blue tunic, which shone like a star amongst the brilliant green bushes. Although a soldier, he was armed with nothing more formidable than an umbrella, and his professional assistance would have proved of but little use to us in case of a row.

At last, to our great relief, we struck to the right across the sand spit, and emerged on the beach, exchanging the steaming and stifling atmosphere of the mangrove swamp, with the thermometer at 95°, for the cool and refreshing sea-breeze. The travelling, however, was extremely trying and fatiguing for the bearers, as the beach they had to traverse was entirely composed of flat, rounded, black basalt shingle, heated by a vertical sun, and they walked the whole way at the water-line, so as to avoid the intense heat of the stones and keep their feet cool. The sea-side of the elevated sand spit was very barren, and not even the screw-pine, which will thrive almost anywhere with heat and sea air, would grow there. In order to rest the men, we halted for a short time under some fine banyan trees, at a small fishing hamlet, Siau-tika, where we noticed some very good-looking women, all with children. Four bamboo catamarans were out fishing just beyond the surf. The people looked contented and happy; and there was a quiet, domestic air about the little place which was extremely pleasing. We then pushed on to Twa-na-pu, a much larger place, and halted at noon in the middle of the place for tiffin. The chairs were placed in the shade of some overhanging bamboos and banyans, and a dense crowd soon collected round them to see us eat. Children appeared to swarm here, and we noticed the same thing at all the villages through which we passed. Most of them were naked, and they all looked healthy and strong. Then on again through a richly cultivated plain of sugar-cane and indigo to Oh-chin (black tree), where we halted in the village for twenty minutes. This seemed to be a flourishing place, and the people all looked well-to-do. There was a good bazaar and fish market, and the whole place was clean and nice. Here we got some excellent mangoes, which were most refreshing in the intense heat. The mangoes grown in Formosa are the only ones I have met with in the far East that closely resemble the Bombay mango in appearance and flavour, and one is tempted to think there must be some connection between the fine fruit met with on the west coast of the island and the early Portuguese who traded there, as it is to this people that we owe the delicious mango found at Bombay.

After resting the bearers we started again, and traversed a barren sandy plain, which must be a water-course during heavy rains; forded five or six broad streams, the water coming up to the knees of the

bearers, and passed a hamlet on the right, surrounded by richly cultivated fields of sugar-cane and indigo, and fine groves of plantains, bamboos, and fruit-trees. A little further on we came to the main river, and crossed in the ferry-boat to Tan-kang (East river), where we arrived about 5 P.M., and put up for the night at the house of a merchant. The ground floor was occupied (as usual) by the family, and the upper floor used as a go-down; so the latter was roughly put in order for us. The cook produced us a very good dinner of local things, viz. broiled fish, sweet potatoes, and prawn curry, which we helped out with a tin of soup. We were unable to sling our hammocks, and therefore lay down on some bedsteads and stretchers which were got ready for us. The heat in this room was stifling, but we had to endure it as it was raining, all except Mr. Hastings, who braved the wet, and moved his bed to a terrace outside.

Tan-kang is a flourishing place of from six to seven thousand inhabitants. It is situated on the left bank of a good sized and deep river, very near its mouth, where there is the usual bar. The houses are principally of wattle or bamboo, and thatched, a few only being built of brick and tiled. It has a large junk trade, and I counted twenty-eight of these vessels lying at the bank, either taking in or discharging cargo. I noticed several good sized shops of crockery and ironware, and some of piece-goods. There were also several stores completely filled with pineapples. These are grown at the back of the place towards the foot of the hills, where they are worth six cash each (about one farthing). At Tan-kang they sell for one-and-a-half cents (three farthings apiece), and are exported in vast quantities to Amoy, Hong Kong, and other places. The Formosa pine, which is very sweet and juicy, has the singular peculiarity of not possessing any crown of leaves; but whether this absence of crown is natural, or artificially brought about during the growth of the plant, I have never been able to ascertain. The want of crown certainly detracts from the appearance of the fruit.

June 19th.—We were to have started at midnight, so as to make as long a stage as possible, but the coolies positively refused to move so early, saying that they were tired. My two men said they were done up, and so they had to hire coolies to carry their loads, and the Commissioner's two gig-men were footsore and very unhappy. At last, after a deal of wrangling, growling, and fighting amongst the bearers, we got away by the light of a beautiful moon a little after half-past four. We crossed a mud-flat at the back of the town which seemed quite alive with some kind of white creatures moving about. On our return journey these proved to be a very large species of hermit crabs, encased in a great variety of shells. We were ferried across two rivers near their mouths, and then passed along a very good road bordered by hedges of screw-pines, and running by the side of a long lagoon. This road was

traversed by carts drawn by buffaloes. These carts had each two huge solid wheels, five feet diameter, keyed on to the axle, which revolved in rough bearings underneath the bottom of the vehicle. We also met some soldiers, one of them mounted on a very fine artillery mule. Quantities of the yellow hibiscus, and a large phlox, both in full bloom, were met with, the former growing here to a large sized bushy tree.

At 9.30 we left the road, which was trending too far inland, and struck down to the beach opposite Lambay Island (Lieu-Kieu). This island produces very fine custard apples, and some beautiful tropical marine shells are found there. It is surrounded by very deep water, and between it and the mouth of the Tan-kang river there is a remarkable depression in the bed of the sea, where the soundings are as much as 185 fathoms, with 139 fathoms quite near to the mouth of the river.

We then traversed for six miles a heavy shingle beach, very tiring to the bearers, and arrived at Pang-liau. There we put up at a nice clean airy *yamen* for tiffin. Across the street, and directly facing the entrance to the *yamen*, there was painted a huge representation of some animal. The body very much resembled in shape that of a gigantic flea, and we all puzzled ourselves to make out what creature it could be meant for. I imagined it must be a buffalo, but on inquiry it turned out to be intended for a lion. After a rest of nearly three hours we started once more, and again struck the beach, where the shingle was so heavy and fatiguing to the bearers that they required frequent halts. We were now very close to the hills, and the plain between them and the sea was rapidly narrowing as we advanced. After a couple of hours' journey we passed three entrenched camps with flags flying, for we had now entered savage territory, and got to a place where the Chinese were actively engaged in fighting the natives. Further on there was a good broad road cut through the jungle, and leading up one of the hills. Half-way up there was an entrenched camp, and another on the summit. There was also another large camp on a hill further on. As we approached Cha-tong-ka, the headquarters of General Wang and his army, we halted to let the mandarin go ahead to announce our arrival, and on the return of his soldier to say all was ready, we moved in at 5 p.m. and put up at the *yamen* of the *Wei-yuen* or district magistrate. This was a mandarin named Choh, who was known to Mr. Brown, as he had accompanied the former expedition in the "Ling Fêng." He therefore came out and welcomed us to his place with great cordiality. He was a small active man, with a most intelligent face, *retroussé* nose, and bright restless eyes; a man of spirit and go, and most unflagging energy. To his many accomplishments he added that of photography, and he showed us some portraits he had taken of himself. His *yamen* was only a temporary building, and little more than a hut, with a small stockaded square in front surrounded by huts. Here we were in the bustle and

activity of a camp, the place being full of soldiers. Choh's own camp immediately adjoined his *yamen*, and at a little distance was a large entrenched camp or fort, where resided General Wang. The Chinese had been fighting the savages in the district for the last six months, since the evacuation of the country by the Japanese, and with such success that several of the tribes had just submitted, and the very day we arrived 100 savages had come in during the forenoon to have their heads shaved. The authorities were fortunate in bringing matters to a close so soon, for cholera and typhus were making sad havoc with the troops, nearly 1000 of whom had died since they had been there. The day before one of the generals died, and had the Chinese been compelled to continue fighting throughout the rains they would probably have lost nearly all their men. Before reaching Cha-tong-ka we had to get out of the chairs and walk over a spur of the hills, which at that place ran right down to the sea, and we noticed that all the jungle had been cut down to keep the road open and prevent shelter for the savages.

Having expressed a wish to bathe, Mr. Brown and I were provided with ponies and a guard of eight soldiers, and we proceeded to the hills, where, at the mouth of a valley, the sides of which were thickly wooded, we had a delightful bathe in a pool of the stream. The bed of the stream was composed almost entirely of pebbles and pieces of dark-coloured shale. Monkeys were plentiful in the trees, and I noticed numbers of fine butterflies, but could not manage to secure any. Having dressed, and not wishing to soil our clean white clothes on the dirty saddles, we walked back to the camp, leaving the soldiers to ride the ponies. They must have belonged to the infantry, for in a very short time two of them were unhorsed in the most ludicrous manner. After our return to camp we had dinner in the open air at a table lighted by lanterns. Our mandarin, Choh, and another native official dined at the same table with us. Choh had recently had a present of some Bass's ale, which was much appreciated. Our brandy also pleased them, but they thought it too strong. A tent was pitched for us inside the stockade, and what with trestles and bamboo frames and our blankets and rugs, we made very comfortable beds. Poor Hastings was attacked with fever, and was very wretched all day, the effect of his previous night's reckless conduct at Tan-kang in sleeping out in the rain and dew. The incessant drumming of the sentries in the camp on their pieces of bamboo kept me awake for a long time, but even this lost its effect at last, and we all dropped off into sound repose.

June 20th.—The camp was astir betimes, and seven thousand Chinese soldiers being called to active work created such a row, that further sleep was impossible. We saw some savage women here, who were either reclaimed or captured; handsome creatures, with their front hair neatly parted and brushed in our style, and their long back hair plaited with strips of red cloth and wound like a coronet round the head.

When we started the mandarin Choh headed the party on his pony. The hills at this part come down quite close to the water, and we had not proceeded half an hour before we had to get out and walk up over a lofty spur. Here one of the first things we saw was a mound by the side of the pathway where one of the men murdered by the savages was buried. A little way further on, half-way down the precipice, and caught in the rocks and bushes, were the remains of a horse and his unfortunate rider, killed by the same cruel creatures. We had another stretch of shingle beach, over which we had to walk to save the bearers, and where we halted to give passage to a file of northern soldiers proceeding to Cha-tong-ka to pay the last honours to the departed general. We passed a long line of stone huts belonging to a fishing village of the savages. The formation at this part was sandstone, and the basaltic sand of the beach had given place to a heavy gritty shingle. At one place an abrupt spur of the mountains ran right down into the sea, and we had a difficult scramble to get over it. After this we quitted the beach, and striking to the left, traversed a small elevated plain on which there was a newly constructed entrenched camp and an older fortification of stone, now abandoned. It was past eight by the time we arrived at Hong Kong, where we put up at the house of the headman of the village. Hong Kong is a very different place from its well-known namesake, being a mere collection of grass huts. The women were mostly reclaimed savages, and several that we saw were very handsome. It was near this place that five months previous the savages had made a sudden descent from the hills and massacred between two and three hundred of the Chinese troops at an encampment in the jungle.

We rested for a couple of hours, and then proceeded along an exceedingly interesting road, and one that struck me as the prettiest part of the whole journey. The pathway lay through a thick jungle composed nearly entirely of *Vitex negundo*, which here grows to a height of 8 or 10 feet. It was in full bloom, and the pretty spikes of lavender-coloured flowers had a very pleasing effect. The formation is a grey sandstone, conglomerate and shale, quantities of the latter occurring in the beds of all the streams. We halted several times to allow Choh to ride ahead to prepare for our arrival at Chai-chêng, and the bearers took advantage of such times to drink and bathe in the beautiful mountain streams which we constantly passed. After emerging from the jungle we entered on a coralline formation, and cycads and screw-pines at once made their appearance in profusion. The line of these was quite sharp and well-defined at the point where the sandstone ended and the coral commenced. The cycads here bear clusters of orange-coloured berries, and attain a height of 12 or 14 feet. Their habit of growth and general appearance are so much those of palms, that they are frequently mistaken for them. The white mangrove also reappeared. Choh, who had been riding on very lazily, and dozing on his pony, here pulled up, and we

found him standing in a small clump of cycads and screw-pines, unable to go on any further through fatigue. His guard of four soldiers was with him. Two of these were armed with matchlocks, one with a pike, and the fourth with a trident. My boy having, unfortunately for himself, the evening before, established a reputation for horsemanship by riding successfully the ponies that had unhorsed the soldiers at Cha-tong-ka, was therefore summarily turned out of his chair, mounted on the pony, and provided with the mandarin's broad-brimmed straw hat to keep off the sun. Choh was installed in the vacant chair, and despatched ahead to Chai-chêng to prepare for our arrival, whilst we stopped and had something to eat. We passed the remains of some very curious savage huts, the walls being partly composed of stones and partly with cycas stems. Further on, as we approached the town, we passed through some good rice fields, where the harvest had already begun. We also met savages for the first time, armed with bows and arrows and long knives. Traversing a rough path through a scrubby jungle, and passing a curious conical hill of coralline crag which harboured some monkeys, we struck down suddenly to the shore, and for some distance went due west along the sand. It was past four when we arrived at Chai-chêng, where we put up at Choh's house for the night. Chai-chêng, which is erroneously called on the charts Liang-kiau (that being only the name of the bay), is a walled town with gates, and is a place of considerable importance. It was, at the time of our visit, the furthest outpost that the Chinese had in this part of Formosa, and it was here that the Japanese landed, and where they remained in possession, during their expedition in 1874, until they evacuated the island in December of that year. The name Chai-chêng means wooden walls, and we learnt that the original station was only defended by a stockade of cycas stems. The town was surrounded by good rice fields, and in the immediate vicinity there were two large entrenched camps, each capable of containing 500 men. The town was crowded by officers. These were northern men, and their scowling faces by no means pleased me. They muttered *Fan-kwei* (foreign devils) as we passed, or as they stood round the door staring at us. Mr. Brown, however, assured me that, disagreeable as this term might sound, it is merely an expression of opinion, and not purposely intended as an insult.

Choh, in the most friendly and hospitable manner, gave us up his own bedroom. The heat and closeness of this room, however, were unendurable, and there was a sickening and unbearable stench about it, which, on examination, we found to proceed from an open drain that ran directly under the boarding of the floor; so, thanking him for his kindness, we asked that a tent should be pitched in the yard at the back. The difficulty, however, was to select a site, for the yard was abominably dirty. It was littered with all kinds of filth and garbage, the family pigs roamed at large over it, and altogether it was a very unpleasant

place. We at last, after a good deal of hesitation, pitched on the upper corner adjoining the wall of the town. This was well swept, and was then strewn over with straw, which was set fire to, in order to destroy the vermin which swarmed somewhat alarmingly in the soil. The place was then watered and again swept, and the tent was then pitched. Mr. Brown and I went down to the river and had a bathe, and had some difficulty in finding our way back to the town through the rice swamps, as we had jumped over the wall and gone a back road to avoid being mobbed.

After dinner the two mandarins came into the tent and had a chat over a glass of sherry and a cup of tea, and it was arranged to make an early start, so as to get over the 24 *li* to Sheomalee in good time to allow us to meet a settler who was friendly with the savage chief, and through whom matters could be arranged.

As the remainder of the journey after Chai-chêng would be over a much rougher road than anything we had yet experienced, and amongst the hills and wild country, we determined on reducing the weight of our baggage and stores as much as possible, and only taking such clothes and provisions as would be absolutely necessary for five days.

June 21st.—We were up at five, but it was nearly eight before we could get the tired bearers and coolies to consent to a start. Striking across the rice fields, we traversed a plain poorly cultivated. Rain, of which there had been some during the night, now came down, and made the walking very heavy for the bearers. We passed two villages, where we stopped for a few minutes, and where the women were all reclaimed savages but the men Chinese, and before arriving at Ho-tung the bearers lost their way, and had to retrace their steps. Ho-tung was an outpost of straw huts, surrounded by a stockade, intended as the site of the capital of a new district. We put up at the hut of the headman of the village, who had lived so long away from civilisation that he scarcely looked like a Chinaman. The people were very civil and attentive, and numbers of children crowded round the door to look at us. Mr. Brown amused them by drawing sketches of ships and various animals, and I greatly delighted them by letting them hear my watch tick against their ears. The elders we regaled with sherry and gin-and-water, both of which they pronounced to be "good." The place is situated in a plain amongst the hills, and the land looked to me very fine and capable of producing anything. I noticed the castor-oil plant growing wild, and the water in the well inside the stockade was near the surface.

After a rest of three hours we resumed our way and struck nearly due east among the mountains along a very good road adapted for buffalo carts, made by the Japanese during their campaign against the savages in the south. We were now in the middle of the peninsula forming the southern extremity of Formosa, and on arriving at the top

of a hill we got our first sight of the Pacific, and stopped some time to enjoy the very beautiful view. A valley bounded by lofty hills lay before us, and through the gaps between the hills we could see the mighty ocean that I had only hitherto read of or heard described. Very high mountains lay to our left, part of the vast backbone that runs down the island, and on our right the hills of the South Cape, and a very singular and sharp-pointed peak, which I christened in honour of the head of our party, Brown's Peak.

After a most beautiful run through a fine tropical jungle, reminding one forcibly of the palm-house at Kew, and passing a place, above mentioned, where inflammable gas is given off, which was said to have been lately steaming, we reached Sheomalee at 3.30 P.M. Choh had gone ahead, and had procured us quarters at the house of the headman of the village, and we found tea awaiting us. Small-pox was raging here, and several of the children were suffering from it. One poor little thing was brought in and shown to us, in a sad state, nearly blind and with a swelling in the neck, and looking very near death's door. We were supposed by the villagers to be doctors, and they were much disappointed when told by Choh that we were only of the official class. Sheomalee was the furthest outpost of the Chinese settlers, and we found it partly inhabited by Chinese and partly by savages. Several of the latter came in armed with their bows and arrows and long knives or swords. They are much darker and more muscular than the former, and go about quite naked, with the exception of a scanty blue cloth round the waist.

The man who was on friendly terms with the savage chief having been sent for, soon made his appearance, and came and sat down in the tent. He was by no means prepossessing, looked a dreadful brute, and more of a savage than anything else. Choh asked him to see the chief and arrange for an interview, so that we might pass through his country and treat for the land. He listened in silence, and with a contemptuous and impertinent indifference, chewing betel all the time at an alarming rate. After the mandarin had concluded, he simply said that he would not go: that the savages were so afraid of the small-pox, they would neither come to us nor allow us to pass through their country: that the chief would now be away up at the hills, and that he refused what was asked, declined assisting us in the matter, and that he should go: whereupon, without further ceremony, he got up and left us. We had everything taken out of the chairs and stowed away for safety, Mr. Hastings having been informed by his cook that the people here were not well disposed, and that possibly we might be attacked and murdered during the night. I lay awake watching the figures stealing about in the moonlight, and got up about midnight to examine the gate of the stockade, which I found closed and secured.

June 22nd.—At 6.40 we started and followed the course of the river, which was at this time a small stream, until we crossed a much larger

river coming down from the north-east. We passed a savage village called Pakolut, the inhabitants coming out to look at us. The men and women here were all naked, with the exception of a cloth round the waist. Tokat, the son of the chief of Pakolut, accompanied us, and crossing the river, we struck to the south into the savage country. Choh, who had ridden up the bank on to a piece of sloping grass-land, now came back and informed us that the savages, who were assembled with their chief in a neighbouring clump, would not allow us to pass through. We had procured at Sheomalee, before starting, two guides who spoke the savage language, and we now sent one of them forward to the clump to ask the chief Tauk-e-Tok to come out and speak to us. He was by no means ready in coming forward, and detained us a long time. He was not a very good-looking man, but I particularly admired the easy grace and dignity with which he walked down the steep bank and stepped in among us. He had only a blue cloth round his waist, and an embroidered bag slung over his shoulder, and a sprig of some green shrub stuck in his back hair. He came armed with his bow and arrows and long knife. His younger brother, who came out with him, remained up on top of a steep part of the bank a little way off till nearly the end of the interview, and then swung himself down the nearly perpendicular face by some grass and shrubs with the activity of a monkey.

A long palaver ensued, and Tauk-e-Tok stated his objection to our passing through his country to be the fear of our bringing small-pox. Betel was then produced, of which the savages are exceedingly fond, and which they all chew to a disgusting extent. At one time Tauk-e-Tok seemed inclined to allow a few of us to pass through, provided the greater number remained behind, or went round by the sea-shore; but after several goes of betel his courage seemed to desert him, and he decided that we must all pass round by the latter route, and said he would meet us at the South Cape, or Wo-lan-pi, as it is called, and not Nan-sha, as designated on the charts, that name not being known at all in Formosa.

As nothing further was to be obtained we produced some *sam-shu* we had brought for the chief, and turned our chairs towards the sea, very much disappointed that the other route had been denied us. After forcing our way with difficulty through a jungle of guava trees and screw-pine, we reached the mouth of the river, and were carried along the sand on the shores of the Pacific. We then entered another jungle of screw-pine, through which we failed to force the chairs, and at eleven we had to abandon them to be carried back to Sheomalee. Taking all the coolies, except two to each chair, and desiring the bearers to meet us with them on our return, we set off to walk due south. We noticed some large timber on the left bank of the river, where the hills appear to be very well wooded. The walk along the beach was very tiring, and it was excessively hot, so at noon we called a halt for rest and food at a good stream of water. We three Europeans entered a cave used by the

savages, in which we found leaves of the cycas strewn on the floor, and where we had good shelter from the sun. We resumed our march as soon as possible, and at 3.30 found Choh had halted at a couple of grass huts near the shore, where he proposed we should stay for the night, as the guides stated that no water was to be procured beyond this. As this seemed a very short day's work, I determined to see whether I could not reach the cape by the high land, and so ascended the cliffs with Choh, Tokat, the old guide, a coolie carrying my gun, and my boy to act as interpreter; leaving Mr. Brown with the young guide and the rest of the party to go further round the shore in search of water. Passed over a fine grass down, and after traversing this a considerable distance saw the woods of the South Cape about a mile off. There seemed a great hesitation on the part of the guide to take us any further, and as it was getting rather late for the attempt, I determined on descending the cliff to join the rest of the party. We had great difficulty in forcing our way through a dense jungle of cyeads and screw-pine growing on the edge of the cliff, but at last succeeded and reached the shore. On meeting them we decided to return to the huts for the night.

It was on the beach below that the savages who accompanied Mr. Brown's party told him they had murdered the crew of the *Rover* which went ashore there, including poor Mrs. Hunt, the captain's wife, and they said they would not have killed her only they did not know she was a woman.

June 23rd.—At 2 A.M. twenty-six armed savages suddenly entered the tent. Mr. Hastings sat up and asked them what they wanted. They said they wished to see the old guide, and then left. The young mandarin was now altogether done up, and said he could go no further, but must return to Sheomalee. I parted from him with regret, as I liked the man, and greatly feared his being attacked and murdered on the road, but we had to think of ourselves, and at 6.30 A.M. we started to reach the South Cape. Before leaving, the guides particularly requested us all to keep together and not to straggle. After ascending the cliff the old guide struck away north, saying that he would take us a better road by which we could reach the west coast, and so get along more easily. We passed through a beautiful park-like wood, with quantities of guava trees loaded with yet unripe fruit, and some fine timber. As we still kept on north, instead of west or south, we halted and remonstrated with the guide, who simply said it was all right, but which statement did not remove the uneasy feeling we had, that we were being deceived and misled. We then passed over some sandhills, and afterwards through another belt of wood, and then suddenly descended on to a fine open piece of grass-land, when we immediately turned to the left, and traversed the edge of the jungle due west. The old guide and Choh walked ahead, and this time I stuck close to them to watch their movements better. We descended through the wood on the

edge of the slope and found ourselves on the shore of the west coast at the head of Kwa-liang Bay, between the two capes. To my utter surprise I found the guide and Choh, instead of turning sharp to the left, south, along the shore to Wo-lan-pi, setting off at full speed along the sand in the direction of the South-west Cape. I shouted to them to stop, and walked south and sat down on a rock to await the arrival of Mr. Brown and the rest of the party. As no satisfactory answer could be obtained from the guide why he was going to the South-west Cape, we insisted on his putting us at once on the right path for Wo-lan-pi. Finding the passage round the sand barred by rocks, we retraced our steps up the hill through the jungle to the grass-land. Here the guides hesitated about taking us any further, but upon being threatened by the mandarin, and forced into compliance, they at last unwillingly struck along a pathway leading due south through the jungle. This wood was even more beautiful than the one we had traversed on the east side of the peninsula. Very beautiful palms of two or three kinds, yellow Nepaul pepper, caladiums, the large-leaved Indian banyan, rattans, and guava bushes were in abundance. A beautiful orchid (*Phalænopsis Sanderiana*) grew on the trees, and we disturbed numbers of monkeys as we passed along.

I was at the head of the line, following close at the heels of the old guide, so as to keep a watch on his movements as I feared he was about to bolt, when, finding we had outstripped the others, I called a halt to allow them to come up. I was sitting down when I heard a row behind, and saw the coolies come running forward with their loads, and imagined the mandarin had been thrashing them for laziness as he sometimes did. Mr. Hastings came forward and said the people of the country were all behind in force, and would not let us go any further. Walking back, I found Mr. Brown and Choh facing a body of savages who were advancing in a semicircle through the wood. I counted twenty-five fine athletic fellows, better looking men by far than any I had yet seen. A great many of them were armed with matchlocks, and they held their lighted portfires ready in their hands. The rest were armed with bows and arrows, and all had the disheartening long knives at their waists. I have never seen firearms kept in such beautiful order as these matchlocks. The barrels and locks were as bright as silver, and the stocks were of a wood as white and hard as holly. There were three chiefs who squatted down close to us, and motioned to their men to close in all round. They told us that they would not allow us to go any further, and that we must return at once. The mandarin Choh talked to them very energetically, and told them the work had to be done, and *should* be done; that he was there by the order of heaven and his master, and that he intended to proceed. That it mattered not if they killed him, for he was determined to do his duty. I don't know if all this was translated to them by the old guide, but they conversed together for

some time in an undertone. At last the eldest chief jumped up and waved his hand so suddenly that I thought we were going to be set upon. It meant, however, that we might go on.

The savages now divided into two bodies, one marching in front of us, and the other behind, whilst a few skirmishers ran through the wood on each side. After a most beautiful walk through the wood we suddenly struck to the left up a steep ascent, and emerged on the grass down where I had been the previous day. Here the savages surrounded us again, and told us we must go back, as they would not allow us to proceed to Wo-lan-pi. Again there was a halt, and we sat on the edge of the ravine discussing our going to Wo-lan-pi. The savages being desirous of knowing what sort of building we intended putting up at the South Cape, I made them a sketch of the lighthouse. One of them came up and touched Mr. Brown's revolver and asked to see it. So trusting that a display of its powers would produce a salutary effect, he fired all the chambers at a neighbouring bank, and made good practice, and they evidently thought us folks that were not to be trifled with. It being now late, and the heat most intense, and the coolies quite exhausted with fatigue, fright, and thirst, we determined on descending the cliff to the huts for the night, so as to resume the attempt to penetrate to the South Cape in the morning.

Mr. Brown and I lay down in the hut to get some rest. As I lay awake looking out of the door of the hut I saw a second body of savages filing along the top of the cliff from the south, and evidently a party that had been sent to intercept us should we have attempted to force our way round by the east side of the peninsula.

A panic now seized upon the coolies, and they declared their intention of returning at once to Sheomalee. The young guide said things were becoming dangerous; and that, if we did not leave at once, he was afraid he should not any longer be able to prevent them from attacking us.

As things, therefore, began to look rather serious we debated amongst ourselves whether it would not be best to return at once, send for Tauk-e-Tok, come to a clear understanding with him about affording us guidance and protection to the South Cape; and tell him, if he did not do this, we should go back and at once return with a body of soldiers to force our way there in spite of him. But eventually we decided on not retiring without accomplishing our purpose.

Choh, therefore, talked to the servants and guides in the most serious way, and threatened them all with dreadful punishment if they moved from where we were encamped, and at last he frightened or shamed them into remaining, and the closing shades of evening probably added force to his words, as they would have been afraid to return along the lonely beach in the dark. It began to rain, and the evening closed in very gloomily. This was fortunate, as the fear of getting wet probably deterred several of the men from running away.

June 24th.—It rained all through the night. At 7.15 A.M. the rain having stopped, we started to find our way to Wo-lan-pi; after ascending the cliff we struck across the grass down in a south-west direction, and passed to the other side through a fine jungle to the west coast; then traversed a coral beach containing fine specimens of sponge and shells with large pieces of red coral, and then struck up to the left through the jungle, and emerged on a fine open piece of grass-land sloping down gradually to the extremity of the South Cape.

The spot was as beautiful a one as can well be imagined. The turf was fine and close, and more like a well-kept lawn than an utterly wild and waste place. On each side of the gently sloping grass-lands there was a dense line of wood, and at the foot, and separating it from the low-lying point of the South Cape, was a belt of jungle through which the lofty *Cycadeæ* towered like palm-trees.* Ebony grew here to a large size, and the forest contained many different kinds of fine hardwood trees. Monkeys also abounded, and we could hear partridges calling in the scrub. The guides kept pressing us to hurry up and get away, and so after having measured off what land was required and taken the necessary angles, we started on our return. We learnt afterwards that we had been watched very closely all the time by the savages who were concealed in the wood, and who were doubtless signalling to the guides for us to be off.

The walk back along the white coral beach was very trying, owing to the heat and glare, and the relief of getting the sea breeze from the Pacific when we reached the top of the grass down was very great.

Whilst we were resting Tauk-e-Tok made his appearance with eight of his savages. He made some lame excuse when asked why he had broken his faith with us. We started at 2 P.M. to return to Pakolut. Tauk-e-Tok accompanied us, and we had by no means a disagreeable walk along the Pacific shore, the rain of the previous night having hardened the sands. We put up at Pakolut for the night, and received a very cordial welcome from Tokat and his friendly savages. We were pleased to notice that the arms of Tauk-e-Tok's men were rusty, showing that they must have had an uncomfortable night of it in the bushes.

On our return Mr. Brown discussed the price of the land with Tauk-e-Tok and his chiefs, and after at first demanding 300 dollars, they accepted 100, and agreed for this sum to give us a large piece of the southern end of the peninsula. A council of some twenty chiefs and headmen was held in the square of the village, with Tauk-e-Tok at their head, to discuss the terms. They agreed to sell us the land, and to afford us protection and assistance in the work. The harmony of the proceedings was somewhat marred by the arrival of the chiefs of a hostile tribe, who, having heard that money was to be paid to the Koalut tribe, had come to demand compensation from Tauk-e-Tok for some cattle stolen

* I measured one last year at the South Cape which was 25 feet high.

from them by his men a few months ago, and retaliation was threatened. As this did not concern us, however, we had our dinner outside the hut we were to occupy, by the light of tallow candles. The heat was beyond all description. We had our beds spread on the floor of the hut, viz. some boards with matting over them, and were kept awake some time by dogs and savages coming and going, and by the incessant talk of Choh, who was doing his utmost to convince the chiefs of the advantage of Chinese rule and customs.

June 25th.—Choh drafted the agreement with the savages for the land, and my boy wrote out three fair copies of it. Then Tauk-e-Tok and five of the principal chiefs signed it by dipping the tips of their fore-fingers in the ink and making a dab at the foot of the document. The hundred dollars were then paid to Tauk-e-Tok and another chief, and Mr. Brown distributed amongst the men and women some beads and red cloth he had brought for the purpose. All being satisfactorily settled, we left Pakolut in our chairs at 8.30 A.M. on our return journey. As we passed out of the village I noticed Tauk-e-Tok's men posted in a semicircle outside amongst the bushes: every man with his matchlock in his hand, and double portfires burning. We had scarcely arrived at Sheomalee when we heard shots fired in the direction of Pakolut, and the guides said the fight about the cattle had commenced. We did not arrive at Chai-chêng until 4 P.M., as the road was heavy with the rain, and the men very tired. They did not expect to see us back, as a report had reached them that we had been attacked and murdered by the savages, and some of the scowling officers looked as if they were rather disappointed at the rumour not turning out to be true.

We started from Chai-chêng at 7 A.M. on the 26th of June, and after frequent halts arrived at Cha-tong-ka at 4 P.M. Here we parted on the 27th with Choh. I left him with regret, as his cheery manner and unflagging energy and activity made him not only a useful, but also a most agreeable travelling companion. Leaving Cha-tong-ka at 5 A.M., we passed a long line of soldiers going south, taking down treasure, and leaving Tan-kang, where we spent the night, at 5.30 next morning, arrived at Takow at 2.30 P.M., having been away altogether eleven days.

Things have changed during the nine years that have elapsed since the journey above described was undertaken. Chinese rule has extended over the south of Formosa: a large walled town has risen at Ho-tung, where we found merely grass huts and a stockade: a fine first-order light-house has been built on the cape that we only reached with so much difficulty, and by its friendly beams at night guides the mariner round a place he formerly dreaded so much. There is now little danger of a shipwrecked crew being murdered, and the blessings of Chinese civilisation have supplanted the sway of the savage, who, however picturesque and interesting a being he may be, is at best but a cruel and treacherous creature.

In introducing Mr. Beazeley,

The PRESIDENT said the subject of the paper about to be read was an overland journey in the Island of Formosa, from Takow to the South Cape. Mr. Beazeley had undertaken this journey as part of his duties whilst in the Department of Works in the Chinese service, and engaged in putting up lighthouses. For a considerable time he superintended the erection of a lighthouse on one of the Pescadores Islands. The coast of Formosa used to be notorious for the number of its wrecks, and also at one time for the fate, at the hands of the savage natives, which befell the unfortunate persons who were wrecked there. It was for the purpose of erecting a lighthouse at the South Cape that Mr. Beazeley's journey was made. This would be the third paper on the subject of Formosa that had been read before the Society. The first was in 1861, by Mr. Consul Swinhoe. That paper referred almost exclusively to the north of the island; but the second, in 1871, by Mr. Thomson, gave an account of an interesting journey made into the interior towards the great mountain range. Mr. Thomson was a skilled photographer, and the beautiful photographs exhibited on the table that evening were the work of his hands. The name "Formosa" was not the Chinese name of the island, but was given to it by the discoverers to express their sense of its beauty; and he believed a more beautiful country did not exist on the face of the globe. He had had, as usual, the privilege of reading the paper, and he would avail himself of the kindness with which Mr. Beazeley had supplied him with certain facts connected with the island, which would be of interest, but which would not be referred to in the paper. Formosa, as was well known, was at this moment of public and special interest, inasmuch as it appeared to be the intention of the French Government to take possession of it, and hold it as a pledge for the payment of the indemnity which they claimed from the Chinese Government. It had been stated that their object in doing so would be to compensate themselves out of the customs and produce of the coal-mines in the north of the island at Kelung; but if that was the source of indemnity for the very large claim made by the French Government, the repayment would be very slow. In round numbers the total imports in foreign vessels, in 1883, amounted to 758,000*l.*, and the total exports to 1,178,000*l.*, making the total foreign trade 1,936,000*l.* Of this sum about one-third consisted of Oolung tea, which was valued at 640,000*l.* Next in importance was sugar, 473,000*l.*; whilst the total export of coal amounted only to 32,000 tons, valued at 17,000*l.* Of minor articles turmeric, to the value of 14,000*l.*, and camphor, 11,000*l.*, were the principal. The island was of difficult access for want of good ports, and it had been established by geologists that it was in process of rising from the sea, which would make the access to the ports more and more difficult. Mr. Beazeley would tell them that there were many places at which it could be seen that the sea had receded and the land had been raised. It would perhaps be interesting to bear in mind that Formosa was about half the size of Ireland. The journey described in the paper was made some years ago, but Mr. Beazeley was there last year to see the completion of his work, so that he perhaps had the most recent information available.

Mr. E. COLBORNE BABER said Mr. Beazeley had compared the shape of the island to a cleaver with a short handle, but he would prefer to compare it to a fish, the nose of which was pointed towards Japan, the tail being the South Cape, to which Mr. Beazeley had directed his footsteps. The backbone of this marine monster was a ridge of mountains running down the middle of the island, the most prominent vertebrae of which were Mount Sylvia in the north and Mount Morrison a little south of the middle of the island. They rose to some 12,000 feet above the sea; and although Mr. Beazeley had informed them that they

were clothed in forests to the top, a statement which there was no reasonable possibility of doubting, yet he (Mr. Baber) had seen snow on the northern parts of the mountains late in June. Lord Aberdare would no doubt have noticed that this likening of Formosa to a fish was only a confirmation, long sought but at last attained, of the statement of a famous Latin poet—

“Desinit in piscem Formosa superne.”

If he likened it to a whale, although he must confess it was not very like a whale, he was asked to account for the blow-holes of the creature. Those blow-holes actually did exist in the north in the shape of sulphur pits and caverns, from which a great stream of sulphurous vapour was continually spouting in many parts. Her Britannic Majesty's Consul at Tamsui resided within an easy morning's walk of an inactive volcano. The summit was a crater 400 yards in diameter, and ten miles off was a spot which was very much favoured for picnics by the European inhabitants. There was there a river of hot water, and not many yards off a cold waterfall. The river was 15 yards broad and five or six feet deep, while the cold waterfall was 50 or 60 feet in height. The surrounding tract was of course burnt ground, where no vegetation could exist; but a quarter of a mile away the flora was luxuriant, and the best pine-apples in Formosa, which were the best in the world, were cultivated on the very margin of Avernus. The western side of the island, which consisted for the most part of plains, was inhabited by Chinese; the mountains and the eastern side were the home of tribes who were generally designated, rather discourteously, as savages. They were doubtless of Malay origin. Between these two races there was war to the knife. But there were a third people, known to the Chinese as Pepohuans or foreigners of the plain, who were on speaking terms with both parties; it seemed certain that they were the inhabitants of the plains during the occupation of the island by the Dutch in the 17th century. These aborigines had in their possession manuscripts, which had been seen by Europeans, but of which no satisfactory account had ever been published. Mr. Beazeley was no doubt well acquainted with this, and would share his regret that no steps had been taken to obtain copies of them. His object in mentioning this was to stimulate the discovery and collection of those documents, which might prove invaluable to the progress of the knowledge of ethnology and linguistics. He wished to ask why some one did not write a monograph on Formosa, for materials for such abounded. There was a great deal of old Dutch information, and more might be sought in the Dutch archives. During the twenty years that an English community had resided in the island several papers had been read on the subject before the Society. A gentleman of distinguished position in our colonial service had lived among the savages, and was reported to speak at least two of their languages, and yet the general English public knew as little about the island as they did in the days of that ingenious impostor Mr. George Psalmanazar. He did not propose to trouble the Society with an account of his own journey among the savages on the lower slopes of Mount Sylvia, but he would conclude with an anecdote by way of illustrating the manners and customs of these so-called savages. A party of English officers from a man-of-war landed on the island, and meeting a company of natives armed with matchlocks, challenged them to a trial of skill in shooting. Affixing a mark to a tree about 100 yards distant, the officers made what they considered pretty fair practice, without, however, astonishing the natives, who, when it came to their turn to fire, disappeared into the jungle like one man, and crawled on their bellies through the undergrowth to about three yards from the target, which, of course, from that distance, they all hit exactly in the centre. When the Englishmen protested that such a method of conducting the competition was hardly fair, the natives replied, “We do not understand what

you mean by fair, but anyhow that is the way we shoot Chinamen." He had intended to describe the European nationalities which had occupied Formosa. One of those was of course the Dutch; the Spanish had occupied a part, as he believed the Portuguese had also done. The name of the nation which had last occupied a port he was not permitted to name, because he might be trenching upon politics.

Dr. COLLINGWOOD said he had listened with great interest to the paper that had been read, describing the adventurous journey that Mr. Beazeley had taken to the south of the island. He had himself, to a certain extent, been among the people in the north of the island. There could be no doubt that the island was rising, and from the appearance of a reef (Pratas) that he visited, the bottom of the sea appeared also to be rising. There were but four harbours in Formosa—Takow, Tamsui, Kelung, and Su-ao. He had entered each of them in Her Majesty's ship *Serpent*, Captain Bullock. Takow harbour was exceedingly narrow; Tamsui had an awkward bar. Kelung had a very large and spacious harbour, consisting of a hollow made by the sea in the sandstone rocks, the stratification of which was shown on the sides of the harbour. Dr. Collingwood had visited the sulphur springs near Tamsui, and described them in Proc. Geol. Soc. June 1887. He had also inspected the coal-mines (so called) at Kelung, which however were, under Chinese management, of no great importance. The seam at its outcrop was 2½ feet thick. No shafts had been sunk, but all the workings were level. Eighty tons per diem were produced by 300 men. It is a poor coal, of a tertiary kind, very dirty, and was supplied to the vessel at about 15s. per ton. Su-ao Bay was the only harbour on the east coast, and not many persons had had an opportunity of visiting that interesting spot. When he was at Tamsui, the Vice-consul, Mr. Gregory, was very anxious that some inquiry should be made as to the facilities for entering the harbour at Su-ao, and Captain Bullock thought he was justified in visiting it in order to make a survey. They went and spent two or three days there, in a village occupied by the tame aborigines, or Kibalan, as they called themselves. They were entirely different from the Chinese, of finer physique, with long hair, and altogether a handsome people. Their language also was totally different from that of the Chinese, who however lived on friendly terms with them. His party were anxious to find some real savages, and wanted to go up from the bay into the interior. They started in a body armed with guns, swords, and pistols, taking some of the people as guides. These latter were most anxious not to go, fearing that they would be murdered. They went for a considerable distance into the jungle, but had to return without seeing the savages. He collected a number of words of their language, which were included in a paper that Mr. Crawford read for him before the Ethnological Society. The people were very quiet and friendly. The President had omitted to mention a third paper on Formosa which had been read before the Society, viz. one containing an account of a little journey which he (Dr. Collingwood) made by river from Tamsui to Kelung. Mr. Beazeley had mentioned that there was an immense population in the south, and he (Dr. Collingwood) had noticed the same thing in the north. Between Tamsui and Kelung his party found it absolutely impossible to fire into the bush, because whenever they looked in any direction they could see faces, mostly of women and children. The whole coast between Tamsui and Takow was very low, but the view occasionally obtained of the mountains was very fine. The first time he ever saw them was when he was entering the harbour of Takow, and he was exceedingly struck with the magnificent sight.

The PRESIDENT, in bringing the discussion to a close, expressed his disappointment at the absence of two gentlemen whom he had hoped would be present, Mr. Thomson, who was in London, but was unfortunately suffering from indisposition, and Mr. Pickering, the gentleman referred to by Mr. Baber, who had lived in

Formosa and had acquired some of the languages of the tribes. He had been obliged to return to Singapore, where he performed the duties of Protector of Chinese coolies. The population of Formosa appeared to consist partly of Chinese, who were the invaders and conquerors of the island, partly of Malays, who were to be found in most of the islands in that region, partly of aboriginal tribes, whatever race they might belong to, and partly by races formed by the mixture of all these. Mr. Baber had referred to the existence of written documents among the aboriginal tribes, and it appeared that Mr. Beazeley had heard of them. It would be well worthy of the intelligence of the European residents in the island if they would address themselves to the task of obtaining possession of some of these writings. There was a branch of the Royal Asiatic Society at Shanghai, and he would ask them to try and acquire specific information on this subject. A good deal had lately been heard about Formosa, and without trenching upon politics, he thought much more would be heard about it hereafter. One of the advantages of a state of war was that attention was more carefully directed to places the names of which had been long familiar, but conveyed no distinct ideas to the mind. He expected that in two or three years almost as much would be known about Formosa as was now beginning to be known about the Soudan. Mr. Beazeley seemed to have been brought into communication not always of a pleasant description with the races inhabiting the island, some of whom were formidable enough, and very different from those that Dr. Collingwood met with in the north. No information was as yet possessed as to the particular family in the nations of the world to which the original inhabitants of Formosa belonged, and he would invite travellers in the East to give the Society the benefit of any knowledge on the subject which they might be able to acquire.

Discovery of the True Source of the Mississippi.

By Captain WILLARD GLAZIER (U.S.).

THE true source of the Mississippi has been a vexed question among American geographers for some time, the country around its head waters being in a very wild condition, inhabited only by Indians, and access to it difficult of accomplishment. In June 1881, I organised and led an expedition with the object of settling for ever the question of the source of our great river. We proceeded in canoes viâ Leech Lake to Lake Itasca, and accompanied by an old Indian guide, pushed forward to the south, and were rewarded by the discovery of another lake of considerable size, which proves to be, without the shadow of a doubt, the true source of the Mississippi, in lat. 47° 13' 25". From notes taken during the ascent, it cannot be less than three feet above Lake Itasca—the hitherto supposed source of the river. The Mississippi may therefore be said to originate in an altitude 1578 feet above the Atlantic Ocean. Its length, taking former data as the basis, may be placed at 3184 miles.

The origin of the river in the remote and unfrequented region of country between Leech Lake and Red river, not less than an entire degree of latitude south of Turtle Lake, which was for many years

regarded as the source, throws both forks of the stream out of the usual route of the fur trade, and furnishes, perhaps, the best reason why its head has remained so long enveloped in obscurity.

I take the liberty of enclosing herewith a map showing my route and the true source of the Mississippi.

To the Secretary,
Royal Geographical Society.

MILWAUKEE, WISCONSIN,
June 17th, 1884.

*A Search in British North America for Lost Colonies of Northmen and Portuguese.**

By R. G. HALIBURTON, Fellow of the Royal Society of Northern Antiquarians at Copenhagen.

No one can find a "message from the sea" telling of the fate of some long missing vessel without a feeling of emotion; but the stray waifs that throw light on the history of lost colonies are of a deeper interest, for they supply missing chapters in the annals of colonisation and early maritime enterprise.

The probable dates of those that are the subject of this paper are:—

1. Vinland the Good, discovered A.D. 994.
2. Fagundes' settlement in Cape Breton, A.D. 1521.
3. A second Portuguese settlement in Cape Breton, A.D. 1567.
4. A Spanish settlement in Cape Breton, between 1580 and 1597.

I. VINLAND THE GOOD.

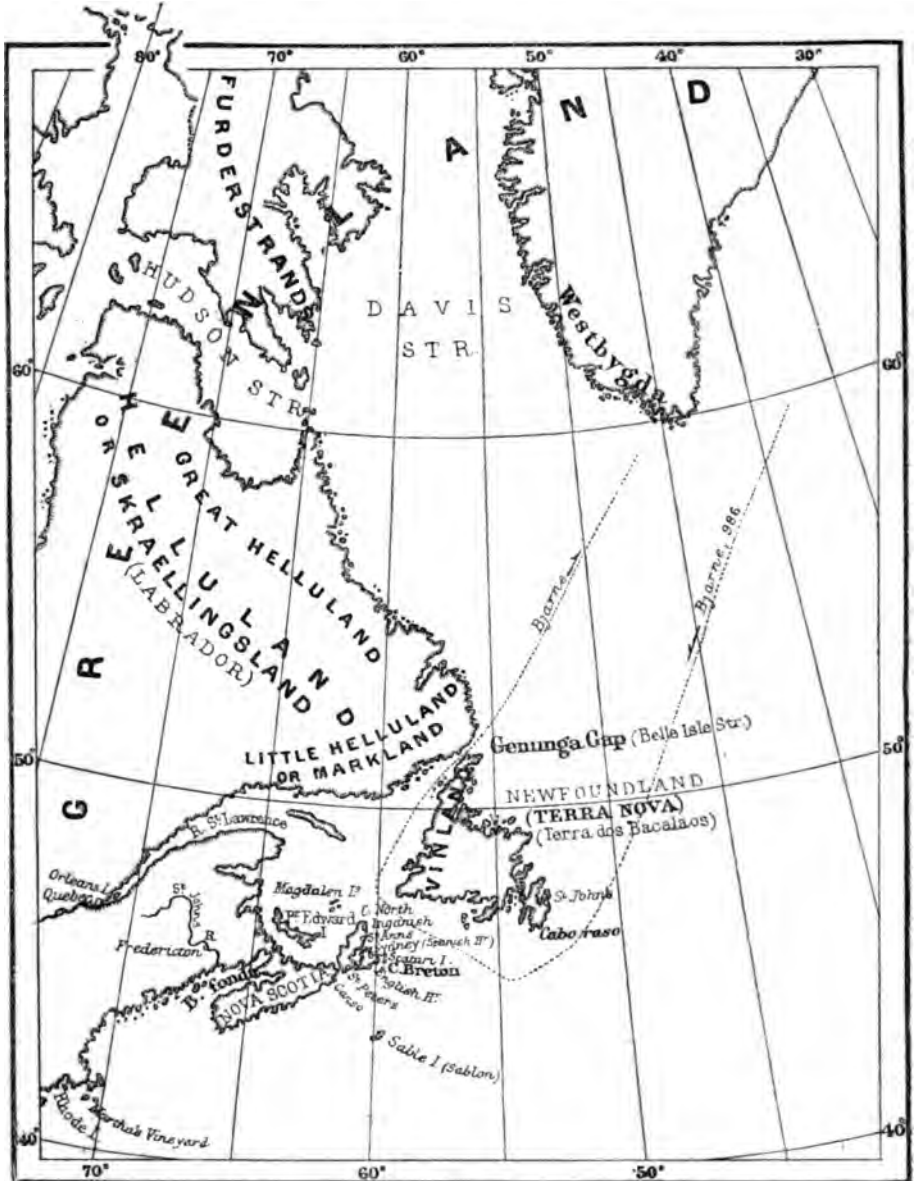
Vinland the Good has been the subject of such a number of books, essays, &c., that a mere bibliography of them would fill quite a number of pages. It is not necessary, therefore, to go fully into what is already well known, or can easily be known by a reference to the various authorities on the subject.

It is unfortunate that the Pilgrim Fathers ever thought of calling a place in Rhode Island *Martha's Vineyard*, for its resemblance to *Vinland* has led Danish and American archaeologists to identify them as the same locality. They seem not to have known, or at least to have remembered, that wild grapes are found on the south shore of the Gulf and river St. Lawrence, from Cape North to Quebec, the island of Orleans having for this reason been called the island of Bacchus. Wild grapes, too, are found on the west coast of Newfoundland, according to Anspach; and in 1521 the Portuguese colonists in Cape Breton sent word home that among the products of that country were grapes. The writer of this paper has tasted some excellent wine made by a relative living at Fredericton, New Brunswick, from the wild

* An abstract of this paper was read by Mr. Haliburton to the Geographical Section of the British Association at Montreal on the 2nd of September, 1884. The present is an abridgment, prepared by Mr. Ravenstein, of his complete paper communicated by the author since the meeting.

grapes that are to be seen hanging in clusters from the elm trees on the intervale lands along the St. John river.

But as Vinland and Martha's Vineyard were assumed to be the



same, a voyage by the Northmen from Greenland, not exceeding seven or eight days, has been extended to Rhode Island, and the circumnavigation of Newfoundland and Nova Scotia has been assumed, although

the Saga of Eric the Red is silent as to it, and though that voyage, still a perilous one, was at that time a most difficult and dangerous undertaking, that cost the leaders of the first two Portuguese expeditions, Gaspar and Miguel Corte Real, their lives.

But in order to get the Northmen to Rhode Island even the scant authorities relied on by Rafn have been distorted or put aside by him in an almost incredible manner. It is a pity that he never asked himself the question whether the narratives he relies on as being honest and true are not in reality utterly worthless, or at any rate open to grave suspicion and doubt.

The Saga of Eric the Red was written in Greenland by, or in honour of, Eric and his family, who were the discoverers, explorers, and chroniclers of Vinland the Good.

The later Saga of his son-in-law, Karlsofne, which, like the geographical notices quoted by Rafn, was written in Iceland, was evidently based, not on information derived from people who had been in Vinland, but on an imperfect version of the Greenland Saga, for almost all the courses described by them differ 90 degrees from those given in the Saga of Eric the Red, a uniformity of error which must have arisen from the use of a sketch-map of the voyage to Vinland, in which the points of the compass were omitted or incorrectly placed. What is north in the one is generally east in the other.

We have therefore to depend on the Greenland Saga, and what are its claims to be considered a credible authority? It was written in glorification of Eric and his family, and describes the discoveries made by his sons or sons-in-law, and testified to by no one outside of his family circle. The very first page of the Saga is sufficient to settle this question.

Two persons, father and son, the latter of whom was named Eric the Red, having been guilty of murder in Norway, took refuge in Iceland, where Eric committed one if not two more murders, and in consequence of them, and of his constant broils and feuds with his neighbours, was banished and outlawed. As the world was too small for him, he was tempted to try to discover and explore the new land in the west, of the existence of which there were rumours. He therefore sailed west, and discovered an ice-bound country, which he called "Greenland," because, quoth he, "people will be attracted to it if the land has a good name."

This intended fraud upon emigrants was an example that was followed in his own day, as well as in later times, for an imaginative chronicler subsequently asserted that "there is the best of wheat in Greenland."

Eric's ruse was successful, for the verdure of Greenland soon attracted hundreds of settlers to the east, and especially to the west coast of Greenland, as the ruins of many churches there still attest.

In A.D. 994 Eric and his son Leif, having heard of new lands further

west having been sighted by Bjarne, made up their minds to explore them, and for that purpose bought and fitted out Bjarne's vessel. But Eric while on his way to the port was thrown by his horse, and took his fall as an omen that he was not destined to give any more Greenlands to the world, and he therefore allowed Leif to sail without him. But from what we know of his proclivities we may be quite sure that he had a wonderful name already coined for that new land—*Vinland the Good*. Could words picture a more attractive bait for emigrants?

How much of the story of the subsequent exploration of Vinland by his son Leif is purely imaginary it is difficult to say. All that relates to shiploads of grapes, self-sown fields of wheat, and the genial semi-tropical winter climate of that favoured land we may dismiss as myths or exaggerations. Where then was Vinland situated?

We have one test, viz. the length of the shortest day there. Professor Thorfaeus, who wrote at the beginning of the last century, found that it indicated 49° N., i. e. the latitude of Newfoundland, which was probably very near the mark, for though Rafn contends for the latitude of Rhode Island, $41^{\circ} 24' 10''$ N., the latest authority, the Icelandic-English Dictionary by Gudbrand Vigfasson (Oxford, 1874), makes the hours of sunrise and sunset 8.30 A.M. and 3.30 P.M. (instead of 7.30 A.M. and 4.30 P.M., as Rafn contends), and therefore carries back Vinland to Greenland.

There is no part of the coast from Greenland to Rhode Island which has not been pounced upon by some writer as the site of Vinland.

We cannot depend on the sailing directions of the Sagas, and Captain Graah has shown that, preserved for a long time only by oral traditions, they have been changed to suit the fancy of the different persons to whom we are indebted for their preservation. We have, however, beside the length of the shortest day, another guide, viz. that the natives met at Vinland were Eskimo, or a race resembling them in their boats, &c.—such as the Naskapi, or "Mountaineers," who are found occasionally in Newfoundland. The advocates of the Rhode Island theory, in order to explain the presence of Eskimo so far south, have started the theory that the Skraelings at the beginning of the 11th century inhabited the eastern coast of North America as far south as Rhode Island, but were driven into the Arctic Regions by the races now found on the sea-coast. Not a particle of evidence can be adduced to support this idea, and the authorities cited by Rafn disprove it, for an Icelandic geographer describes the more northern country, Funderstrands, as too cold for human habitations, and as bounded on the south by Skraelingsland. Their home, therefore, was then, as it still is, Labrador.

Rafn also quotes an account of Arctic explorations as far north as Lancaster Sound, by the Northmen, who found traces of the Skraelings there. So numerous were they in those regions, that they ultimately destroyed the settlements both on the west and east coasts of Greenland.

Helluland and Markland.—From the various accounts given by Rafn I prepared a map, showing Helluland, Markland, and Vinland, which proved to agree almost with the maps * of the Northern Atlantic by the Icelander Sigurd Stephanus (1570), and by Gudbrandius Torlacius (1606) except that I made Genunga Gap run between Markland and Vinland, in accordance with one of the authorities quoted by him. Rafn avers that the descriptions given by Icelandic writers are irreconcilable, when in truth they only appear to him to be so, because he sought to make them support his Rhode Island theory.

It is clear that what is now called Greenland was assumed to be an extension of the North of Europe, and that "Greenland" embraced all the country north of the Straits of Belleisle. Davis Strait was looked upon as an inlet running into Greenland, but not as a strait separating Greenland from the land to the westward. The land north of Hudson Strait was called Funderstrands, and was so cold as not to be habitable. All the country south of Hudson Strait was called Helluland, as well as Skraellingsland (our Labrador), and it was divided into Great Helluland to the north, and Little Helluland or Markland to the south. In one account, however, Little Helluland is omitted and Labrador divided into Helluland and Markland, the latter being to the south. The Westbygda of Greenland, so often referred to, was on the east side of Davis Strait, and was the site of the cathedral. Assuming such to be the case the accounts quoted by Rafn will at once become intelligible and consistent, though totally at variance with his theory, which identifies Great Helluland with Labrador, Little Helluland with Newfoundland, and Markland with Nova Scotia. How utterly untenable his theory is will be clear on comparing it with the authorities which he himself cites.

Thus Bjorn Jonaeus says, "The western deserts of Greenland lie between Westbygda of Greenland and Little Helluland or Markland," which according to Rafn means "between the Westbygda of Greenland and Newfoundland or Nova Scotia."

Again, Bnrdsagn Snaefellsass, quoted by Jonaeus, says, "We call the northern deserts of Greenland Northern Greenland; Great Helluland the *deserts of Helluland*," i.e. according to Rafn, "the deserts of Newfoundland."

Vinland the Good.—Rafn quotes the following notice of Vinland from a fragment of the Vellum Codex, No. 192, supposed to have been written about the end of the 14th century: "From Bjarmeland [in Europe] extends uninhabited land towards the north, until Greenland begins; south of Greenland is Helluland; next lies Markland; thence it is not far to Vinland the Good, which some think goes out of Africa; and if so, the sea must run between Vinland and Markland."

This, I contend, points to Newfoundland, which extends towards

* Published in Kohl's 'History of Maine.'

Africa, and is separated from Markland (Labrador) by the Strait of Belleisle. He adds, "All these countries are in that part of the world called Europe," an idea that prevailed even after the discovery of America by Columbus.

With this account agrees one of a very early date: * "Now is to be told what lies opposite Greenland, out from the bay which has been before named. The land is called Funderstrands. There are so strong frosts there that it is not habitable so far as one knows. South from that is Helluland, which is called Skraellingsland; from thence it is not far to Vinland the Good, which some think goes out from Africa."

Hence it is clear that the Northmen placed the land of the Eskimo between a northerly uninhabitable region and the more southern Vinland.

The same description says: "Between Vinland and Greenland is Genunga Gap, which flows from the sea called Mare Oceanum, and surrounds the whole earth." This is the "River Ocean" of Homer, and is used in the Eddas as the name of the watery wastes of Chaos. The ancient Britons knew it as "the sea of Dylan," which so often meets us in the Welsh triads, and which is to be met with also in Sûs and the Sudân, for a Susi told me recently that "Dylan means a river which surrounds the whole earth."

Bjarne's Voyage to Vinland the Good.—As we cannot rely on the sailing directions given in the Sagas, a very cursory reference to the alleged voyages to Vinland will suffice. The number of days occupied by each voyage is, however, more likely to be correct. Bjarne's voyage seems to have really taken place, and to have been accurately described. The accounts of subsequent voyages appear to have been based on Bjarne's, and to be as nearly as possible mere transcripts of it reversed. In 906 Bjarne sailed from Iceland to Greenland, but "after three day's sailing, . . . the land was out of sight under the water," he was driven southwards by north winds, with foggy weather for many days. At length he once more saw the sun, and having sailed one day more he sighted land. As the wind had changed from north to south-west, in which quarter it remained steady, it is evident that the northerly gale went round with the sun, i.e. to the east, then to south, and then to south-west. Had the wind "backed" to the west and south-west, the weather would have continued unsettled. Hence we conclude that Bjarne's vessel was driven to the banks of Newfoundland, where fogs constantly prevail, whence, the wind veering to the east, south, and south-west, he was driven into the Gulf of St. Lawrence and around Newfoundland. The land he first saw was "without mountains, and covered with wood, and had small heights." It was on his larboard side, and was probably one of the Magdalen Islands, or possibly the eastern end of Prince Edward Island. Afterwards they sailed *two days*, when they saw "a

* Gripla. Antiq. Am., p. 250.

flat land covered with wood." This may have been the north-west coast of Newfoundland near the west end of the Straits of Belleisle, which for a long distance is marked on Bayfield's chart as a "low limestone coast." I am informed that there are woods on it, though they may be small compared with the vast forests that are found up the rivers, whence extensive lumbering operations are now being carried on. Bjarne then put to sea for *three days*, with a south-westerly wind, and saw a third land, which was "high and covered with mountains and ice-hills." They coasted along it, and "saw it was an island." They probably sighted Labrador, and rounding its south-east point, supposed it to be an island. Thence they sailed with the same favourable south-westerly wind (which grew into a gale) for *four days*, when they sighted a "fourth land, which was Greenland."

Leif's Voyage to Vinland.—This seems, as nearly as possible, a version of Bjarne's reversed. Neither time nor bearings are given, and we are merely told that Leif "found the land first which Bjarne had found last."* They saw no grass there. "Great icebergs were over all up the country, but like a plain of flat stones was all from the sea to the mountains." This they called Helluland. They then sailed thence and found another land which was "flat and covered with wood, and white sands were far around where they went, and the shore was low." This was therefore called "Markland" i. e. wood-land. They sailed thence for *two days* with a north-easterly wind (the opposite to that which Bjarne met with), when they sighted an island to the northward of the land, and sailed into a sound, between it and a cape which ran out northwardly from the land. Thence they sailed westwardly round the cape, into a place where at ebb-tide the vessel was left high and dry, some distance from the shore; and when the tide rose, they towed the vessel into a river, which led into a lake (or inlet?), where they landed and built booths.

If this narrative is something more than a Norse Odyssey or a fiction, we must infer that Leif touched at Labrador (called by him Helluland); sailed thence to some more southern part of Labrador (called by him Markland); and thence past the island of Belleisle into one of the many shallow inlets on the south side of the Straits of Belleisle. The "low land covered with wood," and its "white sands" may possibly be the part of Newfoundland sighted by Bjarne, or it may be *Blanc Sablon*, near Bradore Bay, on the south coast of Labrador. It is, however, evident that Leif cannot have reached the south coast of the gulf of St. Lawrence, judging by the number of days expended on the voyage. The Saga of Karlsefne says that the voyage from Greenland to Helluland only took *two days*, and that from Helluland to Markland *three days*.

* In the account of the Saga of Eric the Red, of Karlsefne's voyage, it is simply stated that he sailed to Vinland. The Icelandic Saga of a later date was less cautious, and gives many impossible courses.

Now Leif's voyage from Markland to Vinland took *two days*, or the number of days spent by Bjarne in going from the land first sighted by him to the "flat land covered with wood." Bjarne's voyage from the first land sighted by him to Greenland occupied in all $2 + 3 + 4 = 9$ days.

From the Sagas of Eric the Red and of Karlsefne we learn that the voyages from Greenland to Vinland took six days in all. Hence, Vinland, if beyond Labrador, must be sought for in Newfoundland, either in one of the shallow inlets near the island of Belleisle, or in some place along the north-west coast of that island. The fact that grapes are found there, according to Anspach, lends some weight to this view. It is possible too, that the Naskapi, sometime found in Newfoundland, and resembling the Eskimo in many respects, may have been included under the name Skraellings by the Northmen.

It is clear that, like Greenland, Vinland the Good was a fraud on emigrants; that the stories as to shiploads of grapes, self-sown fields of wheat, genial winter weather, &c., were the productions of Eric's prolific brain; and that we must first succeed in finding Greenland's verdant mountains before we can hope to discover the vine-clad hills of Vinland the Good.

Even the Sagas have not been able to suppress the truth. We find Thorshall, one of Eric's retainers, giving vent to his feelings on the subject of Vinland in rhymes, in which there was more sober prose than poetry, and which from their allusions to "boiling fetid whales," have a decidedly arctic flavour.

Now, when Thorshall carried water to the ship, he sang these verses:—

" People told me when I came
Hither, all would be so fine,
The Good Vinland known to fame,
Rich in fruits and choicest wine.
Now the water-pail they send,
To the fountain I must bend.
Not from out this land divine
Have I quaffed one drop of wine."

When they were about to depart, and to hoist sail, Thorshall again sang:—

" Let our trusty band haste to Fatherland!
Let our vessel brave plough the angry wave!
While those few that love Vinland here may rove,
Or with idle toil fetid whales may boil,
Here in Funderstrand, far from Fatherland."

II. THE COLONY OF TERRA NOVA, OR THE "LAND OF THE CORTE REALS."

The history of European colonisation, north of Florida, has been hitherto supposed to have begun at the commencement of the seventeenth century, except perhaps a small English settlement at St. John's, Newfoundland. It has not hitherto been known to historians that the eastern portion of British North America was the first part of the New World that was constituted a colony, that from 1500 to 1579 commissions were regularly issued to the Corte Reals as governors of Terra Nova, and that by virtue of this claim on the part of the Portuguese, at least three settlements were made by the Portuguese themselves, and later by the Spaniards (after they had annexed Portugal), one of these colonies being the earliest European settlement in North America after the discovery of the New World by Cabot.

A flood of light has been shed upon this early colonisation by Señor Ernesto do Canto, of San Miguel, Azores, whose most recent publication on early Portuguese exploration consists mainly of a selection of documents connected with the family of the Corte Reals, the explorers and first governors of North-eastern America.*

The information contained in Señor do Canto's work enables me to claim for the north-eastern parts of America almost a century of historical existence prior to the seventeenth century. This colony, embracing Labrador, Newfoundland, and Nova Scotia, and, under the grant to Fagundes, probably a large portion on the east coast of the present United States, was far the earliest European colony (excepting perhaps Vinland) not only in North America, but also in the New World, for the commissions of the Corte Reals date in regular succession from 1500 (i.e. two years after America had been discovered by Columbus, and six years after its discovery by Cabot) until 1579, soon after which Portugal and its possessions were annexed to Spain. Kohl is too hasty when he claims that Ponce de Leon, who was appointed Adelantado of "the islands of Florida and Bimini" in 1513, was the earliest European governor in America.

This colony of the Corte Reals was not merely a nominal one, for in the course of the sixteenth century the Portuguese made a settlement in Cape Breton in 1521, and another in 1567, while the Spaniards, their successors, sent a third to the same country. Of these three colonies little or nothing is known; even the colony of Terra Nova has lost its place in history, which begins the annals of British North America a century later with the arrival of French settlers in La Nouvelle France.

In 1500 Gaspar Corte Real explored the coast of Labrador, probably nearly as far north as Hudson Strait, and also Newfoundland and Nova Scotia. He brought back several of the natives, who resembled the

* 'Os Corte-Reaes. Memoria Historica, acompanhada de muitos documentos ineditos.' Ponta Delgada (San Miguel), 1883.

present Micmac Indians. He went there again, in 1501, with three vessels, but that in which he sailed never returned. In 1502 his brother, Miguel, sailed in search of Gaspar, and met with the same fate. Again, in 1503, an expedition was sent out to try to get some tidings of the two gallant brothers, but without success, and the king, discouraged by these disasters, refused to allow Vasco Annes, the elder brother, and one of the ornaments of his court, to continue the search.

In early charts * of this continent the Portuguese flag is frequently represented as waving over Labrador, Newfoundland (Baccalaos), and Nova Scotia, which were sometimes described as the "Land of the Corte Reals," and as the "country discovered by João Alvares."

We now know that the person to whom these Christian names belonged was João Alvares Fagundes, who early in the sixteenth century carried on explorations in North-eastern America, and who, in 1521, had a grant of the country between the land of the Corte Reals and the northern boundary of the Spanish colonies, including the "terra firma and islands" discovered by him, a grant which for the first time included a portion of the United States. It is probable that, from the southern limits of the land of the Corte Reals being very indefinite, this supplementary grant was issued to Fagundes,† who contemplated making a settlement there, and who was appointed governor of it.

Traditions as to this early settlement still linger among the Micmacs, who aver that certain earth-mounds at St. Peter's, Cape Breton, were built by white men before the arrival of the French. This belief received many years ago a confirmation by the discovery in one of these mounds of an archaic cannon formed of bars of iron fastened with iron bands or hoops, those toward the breech being the strongest. This gun attracted little attention at the time, and was broken up. My knowledge of this circumstance is derived from the historian of that province,‡ who for more than twenty years was on circuit in Cape Breton once, if not twice, a year. He frequently spoke of the enigma, and regretted the stupidity and utter want of interest which prevailed at that time with respect to the early history of the country. An inquiry into the date of the manufacture of such guns showed clearly that it must have been brought out before the arrival,§ of the French in Cape Breton. Were these remains at St. Peter's vestiges of this early Portuguese colony? When recently at San Miguel's, I carefully searched with Señor do Canto his *Arquivo dos Açores*, and then found that the colony, composed partly of Azoreans, sailed to Newfoundland, but "finding the place too cold," went south-west to Cape Breton.

* See Peter Reinell's map, 1505; also Kohl's maps, Nos. IX., X., and XIII.

† Do Canto, 'Os Corte-Reaes,' p. 90.

‡ Judge Haliburton, the author's father.

§ The article "Artillery," in the 'Encyclopædia Britannica,' says that such guns were made from 1500 to 1545, when cast-iron guns were first introduced.

From a rare pamphlet, 'Tractado das Ilhas Novas,' by Francisco de Sousa, written in 1570, and published at San Miguel in 1877, Señor do Canto, in his 'Os Corte-Reaes' (pp. 89-93) copies an account of the colony in question, and has also given us a description of the discoveries, and a copy of the commission of João Alvares Fagundes.

It appears from this that the colony referred to by F. de Sousa was planned by some noblemen at Viana, consequent upon the discoveries made by João Alvares Fagundes. They sent out a ship and a caravel, but Newfoundland (Baccalaos) having been found too cold, the settlers sailed to the west and south-west, and having lost their ships, were obliged to remain. News was subsequently received from them through Biscayans, who were then in the habit of frequenting that coast. They asked for priests; said that the natives were well disposed; and that the country produced "nuts, chestnuts, grapes and other fruits, showing the goodness of the soil."

Allusions in early writers point to the existence of this early Portuguese colony. Anthony Parkhurst, in a letter published in 1578, when speaking of the excellent timber in Cape Breton, says:—"I could not find it in my heart to make proof whether it be true or no, that I have read, and heard, of Frenchmen and Portugals to be in that river (the St. Lawrence) and about Cape Breton. If I had not been deceived by the vile Portuguese descending of the Jews and the Judas kind, I had not failed to have searched that river and the coast of Cape Breton which might have been found out to have benefited our country."

Brown,* who quotes this, adds "that we have needs reason to lament that Parkhurst was prevented from visiting Cape Breton by the Portugals, who probably, as reported by some later writers, had made a temporary settlement in the island, and were carrying on a lucrative trade which they wished to keep to themselves."

The settlement here referred to is that of 1567, which will hereafter be described. The colony of Fagundes of 1521 has been unknown to historians, though the circumstances that led to the attempt to colonise Terra Nova have not escaped attention. Peschel† says that "the discoveries of the Corte Reals had no political results except in the active prosecution of the productive fisheries on the coast of Newfoundland." He quotes in a note Francisco do Mendo Frigozo as saying that "soon after the discovery of America a company was organised in Aveiro, Viana, and the island of Terceira for the colonisation of Terra Nova." Portuguese fishermen, it is stated, were seen by English ships near Newfoundland in 1527.‡

Kohl (p. 188) remarks on this, "The Portuguese fishing company made their experiments, and their first fishing voyages were undoubtedly

* Brown, 'History of Cape Breton,' p. 35.

† Peschel, 'Geschichte des Zeitalters der Entdeckungen,' p. 33.

‡ Herrera, Dec. ii. liv. v. c. 4; also Rutt's letter in Purchas' 'Pilgrims,' viii. p. 809.

at the same time real exploring expeditions, continuing the work of the Corte Reals. It is therefore to be regretted that no journals of the voyages of these first Portuguese fishermen have come down to us, and that we know so little of the beginning and progress of these fisheries." No doubt this Viana company must have been in active operation some years before the colony in question sailed to Cape Breton. Fagundes had already been an explorer, and his name is connected with the north-east coast of America by early charts, while his discoveries, as we have seen, are referred to in his commission.

We also meet with a probable reference to this colony in connection with the cattle and swine which Champlain (1618) says "were left there (Sable Island) more than sixty years ago" (i. e. before 1558) by the Portuguese. In Haies's report of the voyage of Sir Humphrey Gilbert, given by Hakluyt, and probably written about 1583, he says, "Sablonyeth about 25 leagues to the seaward of Cape Breton, whither we were determined to go upon intelligence we had of a Portugal during our abode at St. John's, who was himself present when the Portuguese (about thirty years past) did put on the said island both neat and swine to breed, which were since exceedingly multiplying."

It appears that the Baron de Lery, in 1518, landed some cattle at Canso, and the remainder on Sable Island, on his abandoning his intention of forming a settlement in Nova Scotia. It seems also probable that the Portuguese must for the same reasons have landed their cattle at Sable Island, and that that date is the probable time when the settlement of Fagundes was broken up.

It is not improbable that Fagundes' vessels were lost on Sable Island, and that the emigrants ultimately succeeded in reaching St. Peter's, which lies opposite to that island.

We can scarcely hope that something more definite as to the fate of this colony will ever be discovered.

III. A PORTUGUESE SETTLEMENT AT INGANISH, CAPE BRETON, 1567.

De Laet (B. ii. ch. 5) tell us that the Portuguese placed Port Ningani from 18 to 20 leagues to the north-west of the cape which afterwards gave its name to the island Cape Breton, "where they formerly had a settlement, which they have since abandoned." Champlain says that the Portuguese were forced to do this by the cold and rigorous climate.*

Until recently this was all we knew about this colony, but Señor E. do Canto has now discovered a MS. charter in the Torre do Tombo, at Lisbon, from which it appears that the king, on May 4th, 1567, appointed Manuel Corte Real notary public of a colony about to be founded in Terra Nova, and for which two ships and a caravel were then about to start from Terceira.† In 1579 the captaincy of that

* Brown, 'History of Cape Breton,' p. 35.

† E. do Canto, 'Os Corte-Reaes,' p. 161.

colony was conferred upon Vasco Annes, the fourth in succession of the Corte Reals.* The author of the 'Tractado das Ilhas Novas' appears to have sailed with the expedition of 1567, and it is quite clear that up till then no tidings from the colony founded by Fagundes had been received. It is quite clear that a Portuguese colony existed for some time at Inganish, which was abandoned on account of the cold. Was Inganish the site also of Fagundes' colony, as well as of the settlement made in 1567? It seems improbable that the colony of 1521, cut off from all communication from the mother-country for half a century, should have survived until 1567, and we are forced to conclude that the cattle and swine left on Sable Island in 1553 were the property of the Fagundes colonists, who had abandoned their settlements. It seems clear, at the same time, that the colonists who sailed in 1567 were aware that Fagundes had found Newfoundland too cold for a settlement, and had given the preference to Cape Breton. We must assume, therefore, that the colonists of 1567 settled some place in Cape Breton or Nova Scotia. Champlain says the Portuguese abandoned their settlement at Ningani (Inganish) on account of the cold. A Portuguese gentleman informed me last winter that there existed a tradition at Viana, that the colony of Terra Nova was sold to the English on account of the cold climate. Señor do Canto refers to a similar tradition, but applies it to the colony of 1521, instead of to that of 1567.† This sale must have taken place after 1567, for otherwise the Portuguese, having sold out their rights to the English, would hardly have attempted, after the transfer, to make a settlement in that country. It would be interesting if we could find some allusion to this sale in the English records that we possess as to the north-east of America in the 16th century.

IV. A SPANISH SETTLEMENT AT SYDNEY, CAPE BRETON (SPANISH HARBOUR) BETWEEN 1580-97.

We are told that in the 17th century Louisbourg (called English Harbour) was frequented by the English fishermen; St. Ann's by the French; and Spanish Harbour by the Spaniards. Why was Sydney—at one time known as Spanish Harbour—the favourite resort of Spanish fishermen?

About the time Fagundes sailed to Cape Breton, the Spaniards seemed to question his right to that country, as appears from the Spanish map of 1527,‡ where the Spanish line of demarcation includes

* Ib. pp. 121 and 126.

† "A terra descoberta por João Alvares, dizem que foi vendida por seus herdeiros aos Inglezes por ser muito fria."

‡ This anonymous map is sometimes ascribed to Fernando Columbus, but held by HARRISSE to be the work of Nuña Garcia de Torenó. It was an official map of the Spanish Hydrographical Office, and gives the Spanish view of the meridian on which the line of demarcation ran. This line is the same on Ribero's map of 1529. The Portuguese view is shown in the Cantino map of 1502. The map of 1529 is published in Kohl's collection, No. 33.

Cape Breton and Nova Scotia, leaving Newfoundland to the Portuguese. It is probable, however, that the Spaniards did not practically question the claims of the Portuguese, which were specially guarded in commissions to Spanish explorers. In 1580, however, the question was settled by the annexation of Portugal and its dominions by Spain. We know that towards the close of the 16th century a Spanish colony was sent to Cape Breton, and we can assume that it sailed some time after 1580. Our only account of it is a melancholy one, for Charlevoix* says, that the forty poor wretches whom the Marquis de la Roche left on Sable Island (1598), "found on the sea-shore some wrecks of vessels, out of which they built barracks to protect themselves. They were the remains of Spanish vessels which had sailed to settle Cape Breton." Any one who has seen the wreck-strewn coast of Sable Island must remember it as suggesting a graveyard of vessels. Those that have been there a few years are soon covered by the drifting sands, and the half-buried skeletons of later wrecks are to be counted by the dozen, in different stages of sepulture and decay. It is probable, therefore, that these wrecks, which were used by the French convicts, cannot have been there many years previously. The date, therefore, of this Spanish expedition to Cape Breton must have been between 1580 and 1598. We may infer that the emigrants found their way to what was called by them "Spanish Harbour," and that thenceforward it became the resort of the Spanish fishermen.

An inlet in Sydney Harbour is still known as the "North-west Arm or Spanish River."

We have no account of the fate of this colony, but we may infer that it only existed for a short time. The French took possession of, and colonised that country early in the 17th century, and their writers are silent as to the existence of any Spanish settlement there at that time.

It is even possible that this Spanish colony was sent by Vasco Annes Corte Real, for that family was a favourite one with the Spanish Court, and one of the last of them held the important post of Governor of the Low Countries. The interest of the Corte Reals in maritime discovery and in colonisation survived their connection with Terra Nova, for we find that Père Labat dedicates his work to the Governor of the Low Countries, as a just tribute to an enlightened patron and friend.

So thoroughly forgotten is this lost colony of Terra Nova that, though there are many Portuguese names that survive on the map of North-eastern America, they no longer suggest their origin or meaning.

Few persons imagine that the Bay of Fundy is the "Deep Bay," or Baya Fonda; or that Cape Race means the "Bare Cape" or Cabo raso. The "Land of the Corte Reals" knows them no more.

* See Shea's 'Charlevoix,' New York, 1866, p. 244

Afghan Boundary Commission; Geographical Notes.

By Major T. H. HOLDICH, R.E., Commanding Survey Party,
Afghan Mission.

Quetta to Nushki.—From Quetta to Nushki the route taken by the Boundary Commission is the same as that followed last year by Sir R. Sandeman on his mission to South-west Beluchistan. For the first six miles or so it follows the direction of the old Kandahar road through the Gajaband Pass till it turns the shoulder of the mass of hills south of Quetta, of which Chiltán is the dominant peak. Thence it runs straight and even through the length of a narrow valley, overshadowed by the spurs of Chiltán, through Gird-i-bagh, where there is a good supply of excellent water, to Kának, a mud-built village (as indeed are all the villages of Beluchistan) 36 miles from Quetta, on a slight rising sandstone mound surrounded by a patch of irrigated land. The soil seems poor, and the cultivation scanty, water-melons alone being abundant, and such necessary supplies as wood and *bhúsa* (chopped straw) difficult to obtain even for a small force. From Kának to Panjpai, and from Panjpai onwards to Kaisár, another 45 miles, it is difficult to describe the general appearance of poverty and desolation offered by the country we passed through. The road traverses a succession of small valleys, hedged in by barren sandstone hills, across which every now and then it was necessary to pass from one valley to the next. A small stunted growth of shrub (chiefly wormwood and camel thorn) everywhere covered the dusty plain, trees being very scarce, and water in good supply only at Panjpai. Panjpai appears to have been a place of some pretensions in former times. The ruins of an old village closely adjoin the present site, and the crumbling towers and walls betoken a position of strength. It is, however, chiefly remarkable for about a dozen trees fringing the banks of the irrigation canal, a feature which in any part of Beluchistan could not possibly escape attention. Between Panjpai and Kaisár (a distance of 31 miles) water is only to be found at a place called Singbúr Chaman, a narrow little green oasis in this generally sterile wilderness, where five or six wells have been sunk and water reached about 9 or 10 feet below the surface, slightly brackish but drinkable. A curious feature about all this region from Quetta to the Helmund—a region always considered specially difficult to traverse from want of water—is the facility with which water can be obtained by well-digging. The karez system of irrigation (which is merely an underground canal constructed by sinking shafts at intervals and connecting them by a continuous channel) is common at least as far as Nushki, and the karez system is of course inapplicable to any country where water is not found tolerably close to the surface. Between Nushki and the Helmund wells have been specially prepared for the Commission party by the

Amir's agents. There is probably no part of that almost waterless plain where water could not be raised by Norton's pumps in the course of an hour or so. From Singbúr Chaman to Kaisár was a trying march of 25 miles over ground always rough and stony, and occasionally steep and difficult for laden camels, where the narrow path crossed an occasional watershed. This march was accomplished at night, and it speaks well for the efficiency of the transport (locally raised), and the fitness of the escort, that there were no sore backs and no falling out for hospital treatment at the end of it. The climate is specially trying at this time of the year; the intense heat of the sun by day is unpleasantly balanced by bitter cold nights, the extreme range of temperature in the course of twenty-four hours being quite abnormal. Add to this the effect of constant clouds of fine white dry dust—a dust which penetrates to the inmost recesses of all things, blinding and suffocating, and which must be swallowed by the pint; and it is clear that these early days of the work of the Commission are not all pleasure and pic-nic. Night marching will be the regular order of progression, at any rate till the desert is passed and the banks of the Helmund reached. Kaisár, though only a halting-place, was a charming change in the weary scene of desolation afforded by the monotony of dust-coloured sandstone hills overlooking dust-covered sandy plains. The Kaisár stream has formed a wide channel for itself, filled in with a jungle of tamarisk (occasionally mixed with a species of clematis) which fringes the banks, and marks the progress of the river with a really good solid-looking growth of vegetation. Here *chikór* and *sisi* (both varieties of the red-legged partridge), with other small game, were found by the sportsmen of the party, and bagged for the pot, regardless of the usual sporting conventionalities which give every bird a chance on the wing. The truth is we cannot afford to waste powder and shot. The last 10 or 12 miles from Kaisár to Nushki follow the bed of the stream till within a mile or so of the village of Nushki itself. All this line of route, together with a wide tract on either side of it, has either been already mapped by the survey officers who accompanied Sir R. Sandeman last year, or will fall within the regular course of operations of the Beluchistan survey party. Already (28th September) two of the surveyors with the Commission (Captain Gore and Lieutenant Talbot) have pushed on ahead along two lines of route, half-way to the Helmund, and have carried on continuous mapping to that distance. The geography of Beluchistan will be fairly complete, and an excellent start will be obtained for continuation along the line of the Helmund; but further than that it is impossible at present to predict what may be practicable.

Galicha, October 13th.—From Nushki to Kwaja Ali on the Helmund there is choice of three routes, which may be called respectively the Gazchah, the Chagai, and the Pishak. The two former converge at Mamu, after following approximately parallel lines about 14 to 20 miles

apart. The third, which is the most southerly of the three, and consequently describes the longer arc, is the most direct line to Rudbar. The Gazchah, or most northerly route, was the one selected for the march of the Mission, on account of the greater facility for procuring a sufficient water supply. But the Chagai route is quite feasible, involving only one or two marches longer than is convenient for an infantry escort. Both these routes will be surveyed, and as points on each are easily inter-visible, it is hoped that the connection will be kept up throughout. But there is a troublesome strip of absolutely waterless desert, bordering the Helmund on the south, and as this 50 miles or so must be accomplished by the party almost without a halt, it will be a serious obstacle to survey progress. The first march out from Nushki by the Gazchah route was an easy 10 miles over open plain with a surface consistency very like the *put* of the frontier, hard and level and excellent going in every way. The plain is covered with a low growth of tamarisk affording good grazing for camels. At Sanduri five or six wells afforded ample water supply. Water here is reached at 25 to 30 feet below surface level. And it may be remarked that this is by far the lowest depth of any well between Nushki and the Helmund, five to six feet is about the average for the rest of the distance. Sanduri to Band, about 15 miles, affords very small variation on the previous march. The same wide expanse of limitless plain, the same stunted undergrowth, and occasional sand-ridges (or drifts) of a few yards only in width, but deep and shifting in character, taxing for a minute or so the muscles of camels and mules. At Band (as the name implies) a *band* or dam has been constructed across the bed of a nullah in which a very considerable quantity of water is retained. In quantity indeed there was no lack, but the quality of standing water when it is a desert focus for all the living creatures of earth and air for many a mile round, always leaves much to be desired. Careful straining got rid of some of the worms and larger animalcula, but neither boiling, filtering, nor even alum, would render it entirely palatable. It should be remarked that the name of a halting-place simply denotes the position of water. As a rule, not a vestige of habitation is found even near the wells. An occasional *ziarat* or the dwelling of some desert fakir, is the only sign of humanity. Both *ziarats* and huts possess all the grotesque features common to Biluch constructions of the same nature all through the country. They may be described as rough inverted birds' nests of sticks, the upper ends of which are adorned with quaint devices, worked roughly on cloth, or more commonly with mere pieces of coloured rag, and the horns of animals (often of remarkable size and rarity) are constantly brought as offerings to a shrine, and, like the coloured rags, applied to the purpose of outward ornamentation. The interior is usually well filled with the offerings of devotees, offerings which speak strongly of the desert from whence they come. Stray scraps of quartz, or bits of coloured rock,

chrysolite, and serpentine, amongst which may be found curious mineral specimens, are quaintly mixed up with small domestic utensils, and ingeniously constructed little cradles, telling a tale of the hopes and wishes of such of the gentle sex as "love their lords," wishes which are common either in the desert or the city. Some of the ziarats have, however, one unusual feature. Probably as a protection against the prevalent winds which gather unusual force over these unbroken tracts, they are partially burrowed—a long ramp leading down to their floor level, some three or four feet below the ground surface.

At Shah Ismail, half-way between Nushki and the Helmund, is a ziarat of some distinction. An eminent saint who has left his name to the place where he was buried, died here about the time of Nadir Shah, and round about his grave are now collected many other graves of good Mahommedans, who have been carried here to be buried. The saintly tomb is enclosed within a mud-built crenellated wall, overshadowed by two stunted specimens of tamarisk, and adorned with the usual bundles of poles and sticks set up close by with gay streamers and coloured rags fluttering from them in the desert breeze. At the ends of some of the longer pennants or streamers are small bells attached, the musical tinkling of which is carried far across the uninterrupted waste around. An unpleasant peculiarity about these ziarats is the supposed possession of the "evil eye" by one or more of the fakirs residing in them. Certain it is that a failure to present a suitable offering to the shrine results in the sudden death of camels for which it is difficult to account by the usual supposition of poisonous plants or herbs.

From Band (25 miles from Nushki) the next four halting-places are Umarshah (10 miles), Zaro (8 miles), Kahni (19 miles), and Gazchah (14½ miles), in all of which there was a fair supply of well water found a few feet only below the surface. The physical aspect of this part of the desert is much the same as that already described, a flat, hard surface of *put*, bearing indications of occasional heavy rainfall and flood, and occasionally unmistakable signs of snow; the same somewhat scanty growth of shrub (chiefly a low species of tamarisk), and the same sudden occurrence of sand waves or dunes always suggesting the same query, Why are they not blown away by the strong prevailing winds? There must be some core to them, some obstruction on the general level of the open plain on which they formed in the first instance, and which retains them afterwards. That they are fairly permanent is evidenced by the growth of tamarisk brushwood, which is rather thicker and stronger on them than elsewhere.

From Gazchah onwards a marked geographical change occurs. A region of barren trap hills is entered—hills bearing all the same fantastic features common to those that crop out of the great plain between the Kojak and Kandahar, of which both their general strike and geological construction show them to be but a continuation. The first march out

from Gazchah follows the line of a broad watercourse for about 12 miles to a kotal or open pass (water being found on the surface close to this kotal), which debouches on to what is rather a plateau of rolling trap hills than open plain, the plateau rising to upwards of 4000 feet above sea-level, a height which is maintained to Galicha, from whence there is a gradual fall of at least 2000 feet across the waterless strip of 50 miles to the Helmund. The line of march from Gazchah to Safia (18½ miles), Shah Ismail (18 miles), Salihan (15 miles), Mazhda (11 miles), Mamu (15 miles), and Galicha (12 miles), is a mere track winding and twisting over the successive waves of rolling stone-covered plateau hills, with the line of distant rugged peaks to the south; a few scattered isolated hills on the northern horizon, and one or two remarkable conical peaks rising straight up from the plain, forming a peculiarly definite line of landmarks for the marching force. The direction at night was indicated by fires kept up all through the night at intervals of a few miles. By day it was hardly possible to miss the track. In a country where there is but one road signposts are unnecessary.

The Malik-dukán is perhaps as remarkable a peak as any in Southern Afghanistan or Beluchistan, and it most conveniently marks the site of Galicha, the halting-place for the last water before crossing the veritable desert. The Malik-dukán is a straight up and down conical peak as inaccessible in appearance as it is said to be in reality, of the invariable trap formation common to this part of the desert and containing mineral deposits worth examination. The strips of white alabaster decorating the graves about the ziarats, the blocks of light emerald-green chrysolite, occasionally streaked with red, and approximating to the many-coloured serpentine, are all said to come from this hill. Unfortunately time was wanting for a complete examination. The Malik-dukán is now reduced to the position of a survey point—a point too of great value—while a peak adjoining has been appropriated as a survey station. So far as the survey work is concerned, the difficulties of the desert have been surmounted. Plane-table surveys have been carried through two routes, and points already fixed on the Helmund which will secure a fresh base and a good start from Kwaja Ali and Rudbar. But beyond that? Are there hills to help us along or not? Time will show. Taking a general view of the map displacement, it may be said that the Beluchistan mapping of this desert has hitherto been about 20 miles in error westward, i. e. the sites of identified places have to be shifted by that amount to the east.

Between the large area of Beluchistan covered by the mapping of Lieutenants Talbot and Wahab last spring with Sir R. Sandeman's Mission, and that now completed by Captain Gore and Lieutenant Talbot (for my order to join the Commission came too late for me to be able to assist them in this first long link of the journey), North-east Beluchistan is now fairly complete in all essential points of geographical information.

One always interesting feature about deserts of this description is the water supply. As far as the trap formation water has always been found at moderate depths (from 10 to 30 feet) by well-sinking, and excavation has been an easy process; but after passing on to the trap it is a noticeable feature that whereas the water (on this higher level) is nearer the surface, it is not so easy to reach. The surface of all this rolling country appears to be either what is known in India as *kunkar*, or some hard deposit very much allied to it. This crust is not thick, varying from a few inches to a foot; below it comes moist sand and water immediately. This water supply is probably due mainly to the annual snowfall in the neighbouring hills, and also to the condensation of moisture given off from the vast flat plains to the east and south, where an occasional heavy rainfall converts them temporarily into wide-spread lakes.

GEOGRAPHICAL NOTES.

Major Serpa Pinto's Expedition into Central Africa from Mozambique.—This important Portuguese expedition appears to have encountered the usual difficulties with regard to native carriers which beset similar undertakings on a large scale in Africa; and this notwithstanding the powerful support of the Colonial Government at Mozambique. It has been delayed for several weeks near the coast for want of men, and a large number of loads have been sent back. This has necessitated a change of route. Major Serpa Pinto has now decided to take the coast-road to Pomba Bay, and if he can obtain there the carriers he requires, (about 250) he will make it his starting-point inland towards the Meza Mountains. His route to Pomba will probably be that taken by Captain Elton, in his journey from Mozambique to Ibo, in 1876, and he expects to be a month on the road. At Moosuril, where he has been detained, he has taken 178 observations for latitude and a number for longitude, the former of which fix the place as being 1° to $1^{\circ} 5'$ south of its present position on the charts.

The Upper Niger.—The exact position of the French on the upper portion of the Niger at the close of the year 1884 is not quite understood. A paper by General Faidherbe, late Governor of Senegambia, published in the *Revue Scientifique*, Paris, Nov. 15th, 1884, gives us authentic information. The fort of Bamaku on the Niger was occupied in April 1883, and the last mail from St. Louis has brought the news that a small steamer, sent from France in sections, has been forwarded to Bamaku, where it was put together, and now floats upon the Niger; on the 11th of September it travelled down stream *en route* to Timbuktu, which is 300 leagues from Bamaku, with no obstacle of any kind at

that season of the year to impede navigation. The General considers the basin of the Niger to be at the disposal of the French from Buré to Boussa, at which place the English Protectorate commences. What the French call the Niger, is what the natives call the Joliba, and we call the Quorra or western branch of the Niger.—With regard to a Trans-Saharan Railway, the General considers that the Algerian Railway should be continued from Mecheriah, the most southern outpost, to Ainsala, in the Oasis of Tuat, in the territory of Morocco; from that point camels would convey merchandise to Timbuktú.—The railway from Medina, on the Senegal, to Bamaku is not advancing with such rapidity as was expected, and its construction will still occupy time. When this is completed, the access of the French to the Upper Niger will be twofold: A. By Algeria and the Sahara Railway to Ainsala, and thence by camels to Timbuktú. B. By St. Louis river steamer to Medina on the Senegal, thence by railway to Bamaku, and from the latter place by steamer to Timbuktú.

Marine Survey of India, 1883-84.—Commander L. S. Dawson's, R.N., report on the above operations shows that charts of the following localities will result from the year's work: Cochin and Quilon, on the scale of eight inches to the mile, Shial Bet, Mahuwa, Vizagapatam, Calingapatam, Negapatam, and Rangoon port, on the scale of six inches to the mile, and Rangoon river and approaches, including the entrance of the China Bakir river and Cheduba Strait and approaches to Tongoup and Sandoway, on the scale of two inches to the mile. The first two of these (Cochin and Quilon) were undertaken at the request of the Travancore Government, who wish to construct a deep-sea harbour at Quilon, where there are exceptional facilities for navigation in the extensive backwaters running north and south. Mowa or Mahuwa bay and creek on the Kathiawar coast was surveyed at the request of the owners of the coasting steamers; the soundings covering sixteen square miles. The anchorage inside Shial Bet island was also surveyed, in view of the probable extension of the railway to Kathiawar from the existing line running to Gondal. Commander P. J. Falle, I.M., carried out the survey of Vizagapatam not without considerable difficulty owing to the unsettled weather and the high surf, which on one occasion threw the steam-launch on her beam ends, extinguished her fires, and washed overboard Mr. Beaumont, who barely escaped with his life. At Calingapatam the survey was rendered necessary by the increasing trade and the position of the sunken rocks being imperfectly known. A line of deep-sea soundings was taken across the Bay of Bengal to Cheduba Island on the Burmah coast from the *Investigator* when she was making her way over to undertake the survey of the Rangoon river after the completion of the Cochin and Quilon survey. The important survey of Rangoon port and river, covering nine and 168 square miles of soundings respectively, was completed by the 19th

March last, and revealed two noticeable facts, that the eastern channel into the Rangoon river had a depth of at least 21 feet at its entrance, and would be more direct than the western channel, particularly for vessels to or from Moulmein, and that the China Bakir river affords an entrance to the Irawadi at high water for vessels drawing as much as 15 feet.

Obituary.

Mr. J. Turnbull Thomson, late Surveyor-General of New Zealand.—Our Society has lost one of its most distinguished members by the death of Mr. J. T. Thomson, the enterprising and accomplished pioneer surveyor of the Southern Island of New Zealand. He died on the 16th of October last, at his residence in Invercargill, Southland, at the age of 63 years. He had been a Fellow of our Society since 1848, and contributed an important paper to its 'Journal,' viz. "Reconnaissance Survey of the South District of the Province of Otago," published (with map) in the 'Journal,' vol. xviii. p. 298, with an abstract in 'Proceedings,' vol. ii. (old series) p. 354.

The following biographical sketch is taken from the *New Zealand Times* of October 18th, 1884, with an addition from the *Southland Times* of October 17th:—Mr. Thomson came to the colony in 1856, possessed of ample means, and with the intention of engaging in pastoral pursuits. But he soon relinquished that idea in favour of following his profession of surveyor and engineer, by accepting office as chief surveyor of Otago, under the late Captain Cargill, the first superintendent of that province. His seventeen years of previous official life in the East India Company's service stood him in good stead in organising the departments of the provincial service over which he had control. He had not been many months in office when, with characteristic energy, he took the field in person, and in a remarkably short space of time explored and mapped 10,000 square miles of country, thereby enabling its occupation to proceed intelligently. This valuable class of work was rapidly extended over the *terra incognita* now familiarly known as the Lake Districts, by the able band of assistants he gathered around him. For many years under the successive superintendents of Otago, Mr. Macandrew, the late Sir John Richardson, and others, he was the trusted adviser of the Government, no work of any importance being undertaken until his advice had been obtained. But his great delight was in the establishment of a correct system of survey and record of the Crown lands. To that work he gave the greatest attention, and with such a measure of success, that when on the abolition of the provincial system in 1876, the General Government had to assume charge of all the surveys of the Colony, he was by common consent designated to the charge of organising the various survey systems of the provinces into one department. He entered on this work at much personal inconvenience, but with the proud consciousness that the opportunity had come in his way to perform a great service to the colony. Having laid down the lines of a correct system of survey, he felt that in 1879 he might retire from official cares, and devote the remainder of his life to settling on his property at Invercargill, and in the pursuit of his favourite studies. In working at one of his inventions a few months ago, he unfortunately caught cold, which began an illness that has cut him off, at what, to a man of his remarkably regular habits, may be called the comparatively early age of 63. The announcement of his death will be received with great regret by a wide circle of friends. For although Mr. Thomson, by natural reserve of disposition, did not invite acquaintance readily, yet no one could

come much in contact with him without feeling respect for his evident thoroughness and sincerity. He had no time for palaver or pretence in any form, yet was ever most patient and kind to all who sought his advice or were dependent on him in any way. By those who had long served under him he was idolised as the ideal of what a gentleman, and the head of a great public department, should be. He was the author of two volumes entitled 'Life in the Far East,' of several other works on social and economic subjects, and many of his papers on practical and scientific subjects are to be found in the 'Transactions' of the New Zealand Institute. He was also an artist of considerable merit. But his claims to public recognition and remembrance rest principally on the fact that he was the author of what is now known as the New Zealand system of survey. In it his aim was to establish a mode of rapidly placing settlers in occupation of their land, free from any after risk of embarrassment from imperfect surveys or defective description of title. The security of tens of thousands of settlers in the quiet enjoyment of their properties to-day, will best say how he succeeded. His personal bias, no less than his professional training, led him to devote himself assiduously to the interests of the settlers, for he was fond of alluding at times to his native Northumberland, and to the fact that he came of a race of yeomen farmers who for many generations had farmed their own lands on the Border.

Mr. Thomson was born at Glororum, near Bamborough, Northumberland, England, on the 10th of August, 1821, and had thus entered on his 64th year. His father was the third son of James Thomson of Earnslaw, Berwickshire, and his mother was a daughter of John Turnbull of Abbey St. Bathans, Berwickshire. He was educated at Dunse Academy and at Wooler, and studied further at Marischal College, Aberdeen. He afterwards studied engineering under an eminent master, and was in the same office with the celebrated Sir Wm. Armstrong. In 1858 he married Miss Williamson, whose father was one of the pioneer settlers of Otago. Mr. Thomson has left behind him a widow and a family of nine daughters.

REPORT OF THE EVENING MEETINGS, SESSION 1884-5.

Second Meeting, 24th November, 1884.—The Right Hon. Lord ABERDARE, President, in the Chair.

ELECTIONS.—*Charles Aburrow, Esq.; Colonel Sir Henry Havelock Allen, Bart.; Lieut. R. Bacon, R.N.; Rev. Ralph Milburn Blackiston, M.A.; William Bramham, Esq.; Moritz William Ernest de Bunsen, Esq.; Captain Warren Fredk. Caborne; Colonel Aylmer S. Cameron, V.C.; George G. Chisholm, M.A.; Dr. Herbert David Crook; Major W. G. Cumming, R.E.; Walter C. Davies, Esq.; Alfred Elborough, Esq.; Captain Jno. Grant Elliott; Joshua Ellison, Esq.; Wm. Joseph Foster; T. J. Haughton, Esq.; James Hamilton Haysman, Esq.; Rev. Geo. Heavyside; Lieut. Colonel J. R. Hogg, R.E.; T. R. Jarvis, Esq.; Jno. Gordon Kennedy, Esq.; Rev. Hy. Wm. Little; Geo. Lockyer, Esq.; General W. Mesny; Joseph Moore, Esq.; W. J. E. de Müller, Esq.; Capt. Geo. Chas. Parker; Lieut. Patrick H. Ray (U.S. Infantry); E. B. Sargant, Esq., M.A.; Richard Tunnye, Esq.; Rev. F. Augustus Walker, D.D.; James Watt, Esq.; Charles Winnecke, Esq.*

The following paper was read :—

"Overland Journey in the Island of Formosa, from Takow to the South Cape."
By M. Beazeley, C.E. (*ante*, p. 1).

Third Meeting, 8th December, 1884.—General Sir H. C. RAWLINSON, K.C.B.,
in the Chair.

ELECTIONS.—*James Alexander, Esq.; William Brownscombe, Esq.; James Crowdy, Esq., M.A.; Rev. Chauncy Maples; Geo. Arthur Musgrave, Esq.; Lieut. Thos. Fras. Pullen, R.N.; Arthur Ernest Roberts, Esq.; James Robertson, Esq.; Admiral Sir Spencer Robinson, K.C.B.; Capt. Arthur Graves Spratt; Rupert Swindells, Esq.; Sidney Weetman, Esq.; Fras. Sidney Weller, Esq.; Charles Wood, Esq.*

The paper of the evening was as follows:—

“Four Years’ Journeyings through Great Tibet, by one of the Trans-Himalayan Explorers of the Survey of India.” By General J. T. Walker, F.R.S., C.B., late Surveyor-General of India.

Will be published, with maps corrected by General Walker, in the February number.

PROCEEDINGS OF FOREIGN SOCIETIES.

Geographical Society of Paris.—November 7th, 1884: M. BOUQUET DE LA GRYE, of the Institute, in the Chair.—It was stated that the Society had lost by death during the recess several of its members, and among others, M. P. F. Fournier, member of the Central Commission, who had left to the Society a sum of money as a token of his interest in geographical studies. The Chairman then read, amidst the applause of the meeting, a paragraph from the will of the late M. Fournier, which ran as follows: “I bequeath to the Geographical Society of Paris the sum of 2000*l.* (50,000 francs) for the purpose of creating a prize, to be awarded annually to the author of the best geographical work, either map or book, published during the year.” The town of Oran (Algeria) had been indicated as the place of meeting for the Congress of the French Geographical Societies in 1885, but in consequence of the cholera, which was raging in the south and threatening Algeria also, it had been deemed advisable not to hold the meeting in that town. The Congress would, however, meet at Oran at some future time, probably in 1888. Another French city would shortly be appointed for the sitting of the Congress of 1885.—Communications had been received from the following societies, announcing their formation: the Geographical and Ethnographical Society of Turin, the Commercial Geographical Society of Central Switzerland, the Commercial Institute of Paris or Preparatory School of Export Commerce, where the lectures, which commenced on October 1st, had already been attended by a large number of persons.—The Minister of Public Instruction, who had just presented to the Society marble busts of La Pérouse and Bougainville to adorn the hall of its meetings, forwarded two maps just published by that administration: (1) a map in seven sheets, on the scale 1:80,000, reproducing the survey of the Ogowé from Lambarena to the river Lola, executed by M. Dutreuil du Rhins; (2) a map in one sheet, on the scale 1:1,500,000, of that part of Western Africa situated between the Ogowé and the Congo, which had been prepared by M. Hansen, under the direction of M. Dutreuil du Rhins.—The Minister of War transmitted the third part of the map of Algeria, scale 1:50,000.—A map on the scale 1:100,000 of the environs of Turin as far as Mont Cenis was received from the Italian Cartographical Institute established this year at Rome. This map was stated to be the best yet published of a district famous in the military history of France.—Rear-Admiral Mouchez, Director of the Observatory at Montsouris, near Paris, sent a communication informing the Society that that observatory was now

open both day and night free to all travellers, and indeed to all persons desirous of becoming acquainted with the use and management of instruments employed in making observations and calculations in order to determine geographical positions and the variation of the compass. Since the foundation of the establishment some eight or nine years ago, no less than 75 travellers had availed themselves of this privilege. Moreover, the Office of Longitudes had just decided that a young astronomer should in future be attached to this work, with special instructions to give to any travellers who might desire the practical lessons required by them. The Admiral declared that, when such facilities were at command, any explorers setting out unprovided with this preliminary and necessary information would be absolutely without excuse. He contended that no mission should in future be allowed to start without having undergone a preliminary course of instruction at Montsouris, and requested the Society to bring its influence to bear upon the Government with the view of securing this object.—M. Mich. Venukoff informed the Society of the various events of geographical interest which had taken place in Russia during the recess. M. Potanine had commenced his journey in Northern China and Mongolia, his first report having already appeared in the Russian paper *La Revue d'Orient*. The Russian mission, which was going to take part in the operations of the International Commission charged to settle the line of frontier between Turkistan and Afghanistan, had started *en route*. The members of the mission were General Zeneloi, President, MM. Lessar and Alikhanoff, Colonel Coulberg, and ten topographers. One of the members of the Polar station at the mouth of the Lena had remained in Asia, as he was anxious to bring home from the north a mammoth, which was in excellent preservation in the snow, but the excavation of which necessitated long and difficult operations. M. Venukoff stated that the geological map of Russia in Europe was steadily progressing, the necessary researches having been made by several men of science. He announced also the early publication of a most comprehensive work on geology, which would give a large number of details as to the geological constitution of the soil of Russia. The author of the work had just made an interesting study of the changes observed in the chemical composition of several mineral springs, and this was a fact of importance to physical and medical geography. Another Russian geologist, M. Sokoloff, had published a work, not less interesting, on the downs along both banks of the Volga to the north of the Caspian Sea, where the extent to which the sands were gaining on the land in the south-east of Europe was very apparent.—The Minister of Foreign Affairs communicated several letters from diplomatic agents containing information of geographical interest, and among them a report from M. Bruwaert, Consul at Chicago, on the expedition of Lieutenant Greely. There were also two despatches from M. Ledoulx, French Consul at Zanzibar, (1) on the explorers in Eastern Africa, (2) on the expedition of Lieutenant Giraud. In the former of these communications, which was dated August 30th, the Consul stated that two missionaries of the Order of the Saint Esprit had started from Mondha a month before, with the object of choosing a site for a new station. Instead of following the routes frequented by caravans, they had thrown themselves into the interior along the chain of the Nguru Mountains as far as the peak of Kilindi, in order to reach the river Rufu and Pangani, thus taking a route up to that time unexplored. The two Fathers had surveyed with great care the districts traversed, and had obtained their altitudes; they had sent to the Consul some interesting ethnographical observations as well as notes on the regions frequented by the tsetse fly, the disastrous effects of which were only too well known. The different observations would be forwarded in due course; for the time being the Consul confined himself to sending a sketch of their itinerary, which, despite its rough execution, filled up what was formerly a blank on our maps of

that part of Africa. In his second letter of the 12th September, M. Ledoulx stated that M. Giraud had been abandoned by all his porters and the men composing his escort, who had deserted with the arms and baggage. The Consul had been apprised of this by a letter, dated August 4th, from the Superior of the Mission of the Algerian Fathers at Kipalapala, near Tabora. M. Giraud had succeeded in sending word to this priest, Father Hauteœur, informing him of the desertion, and enclosing a note for the Consul, which he requested him to forward without a moment's delay to M. Ledoulx. The latter had received nothing; probably in this note M. Giraud had acquainted him with the desertion of his porters, and asked him for the means to supply the deficiency. However, Father Hauteœur, just as he was forwarding this letter to the Consul, had been attacked by a dozen drunken natives, armed to the teeth, who, having struck the Superior and threatened him with death, had taken away the letter from him. They were the deserters of M. Giraud, and declared in their fury, as they went away, that they were ready to kill any messengers whom the priest might send to M. Ledoulx. Informed of these facts by the Consul, who had himself been advised of them, the Sultan of Zanzibar had given strict orders for the severe punishment of the offenders. With regard to M. Giraud, he was, at the time of writing, in safety at M'pala or Karema, and in all probability would not pursue his journey until he had assured himself as far as possible of the means of accomplishing it with security.—M. J. Leclercq, Vice-President of the Royal Geographical Society of Belgium, had, it was stated, visited during his recent journey in Mexico a number of ruins, and among others those of Tola (formerly Tulam), the capital of the Toltec nation. These ruins had previously been excavated and described by M. Désiré Charnay in 1880. Already, however, they no longer presented the same appearance as they did when seen by that archæologist; the rains and especially American tourists were damaging them rapidly, and M. Leclercq was afraid that in ten years' time one would no longer be able to recognise even the spot upon which they formerly stood.—A letter was received from M. Edm. Cotteau, written on July 5th from Samarang, in which he informed the Society that he had made ascents of several of the volcanoes of Java, viz. Mount Cheda, 9844 feet (3000 metres); Mount Merapi, 9450 feet (2880 metres), the ascent of which occupied three whole days, but it was not so difficult as reported; Mount Bromo, 8203 feet (2500 metres), which was still active; Mount Smeru, 12,469 feet (3800 metres), a neighbouring peak to the last-named, and forming the culminating peak of the island of Java. The writer stated that there was no occasion to be frightened at ascending volcanoes in Java, although they were reputed to be most arduous. In the Alps and glaciers of Switzerland these ascents would be regarded as mere child's-play. M. Cotteau added that, thanks to the development of means of communication, travelling in the interior of Java required the expenditure of far less time and money than heretofore. He affirmed that the climate of the island was better than its reputation, and that in the interior there were a large number of places enjoying a temperate climate. On July 10th, M. Cotteau intended to set sail for Australia and to visit New Zealand also.—A letter had been received from M. A. Hoosie, English Consular Agent in the province of Se-chuen (China), enclosing his photograph, which had been requested for the Society's collection of portraits, and stating that he had just completed his third journey in Western China. He had, according to the letter, reached the extreme limit of navigation on the Kin-chiang.—Dr. Collin had just returned to Paris from a mission in Senegal, with which he had been entrusted by the Minister of Naval Affairs eighteen months ago. He had traversed all the auriferous countries along the eastern basin of the Falema, and had concluded with the chiefs treaties advantageous to the interests of the commerce and exploration of gold. M. Collin had prepared an itinerary on a large scale of his

journey, and intended shortly to publish an account of the same.—It was stated that M. Charles Rabot had also returned home from his travels in the north of Europe. After completing the survey of the southern part of Svartisen (Norway) M. Rabot set out to study the district of the Pasvig and Enara (Russian Lapland and Finland), a region still little known. He surveyed by means of the compass the whole course of the Pasvig, viz. 78 miles (125 kilometres). In September he pushed on to a point in Russian Lapland, where he also occupied himself with topography, and made a sketch by means of the compass of the river Tulom over a course of 43½ miles (70 kilometres). The region had not up to that date been accurately depicted. As an instance of this it might be stated that, whereas Russian Lapland was generally represented as a flat country, according to the traveller it was hilly. M. Rabot added further that this summer the condition of the ice-floes in the glacial ocean had been unfavourable.—The General Secretary then said that he had hoped to be able to announce the presence at the meeting of Dr. Ballay, companion and colleague of M. de Brazza, who had returned to France. His labours in Africa were briefly as follows: he had traversed the country between the Ogowé and the Alima, having collected documents for a map of that region; he had surveyed with the aid of the compass the course of the Alima from the river Kilu down to the Congo, and had launched on the Alima a small steamer, which was at present navigating the waters of the Congo. At the most important points he had determined altitudes by means of the barometer and hypsometer. Finally, he had observed a very large number of latitudes and ten longitudes on the Alima, Ogowé, and Congo.—M. Dutreuil du Rhins, who was unable to be present at the meeting, sent a résumé of the journey recently accomplished by M. Dolisie, a member of the Brazza Mission, between Loango and Brazzaville by way of the Kuilu-Niari. Although abandoned by a number of his porters, the chief of the caravan had ascended the Ludima, an affluent of the Niari, and arrived at the point where the former of these rivers empties itself into the latter. The king had given to the traveller a piece of land in an excellent situation at this confluence, and had even signed a treaty, placing all the country between the Ludima and the Niari under the protectorate of France. This prince had further signed, in conjunction with all the chiefs, a solemn and authentic declaration to the effect that they had never ceded any of their rights to the International Society, which was not even the owner of the land upon which its stations were built. The journey accomplished by M. Dolisie in forty days could undoubtedly be made in half that time when it should be possible to utilise the water-way and to organise a regular service of porters, as among the Batekes. Thus, added M. Dutreuil du Rhins, were the prognostications of M. de Brazza justified: the route of the Niari discovered by him had been recognised as practicable and preferable to that of the Congo and even to that of the Ogowé. Both the entrances of this route on the coast of Loango and its termination at Brazzaville were in the hands of France, and the said route would thus traverse a district placed under French influence. It should be stated that two new French stations have been established, viz. that of Niari-Lundima, founded by M. Dolisie, and another near Philippeville, thus completing the line of French stations between Loango and Brazzaville.—M. de Chancourtois, Chief Inspector of Mines, laid upon the table a printed report, of which he is the author, dealing with a subject which he had already on several occasions discussed before the Society, viz. the question of the unification of the meridian and the hour, and said that the conclusions of the above-mentioned treatise, published before the Conference of Washington, were entirely in harmony with the instructions given to the French Commission delegated to that Conference. M. de Chancourtois then informed the meeting of the results of the said Conference. He congratulated himself especially that "France was freed from a kind of engage-

ment entered into at Rome in favour of the Greenwich meridian," which he said could not be adopted as the initial meridian, when it was a question of choosing the most favourable starting-place from a geographical point of view. Another topic, which had been already touched upon, but only lightly, at Rome, had been brought forward by M. Janssen (of the Institute), a member of the Society and one of the French delegates to the Conference. This was the subject of the decimal division of the circle and that of the corresponding time; by a majority of 21 out of 24 votes the necessity of studying the means for carrying out this reform had been recognised. M. Janssen on his return to Paris would himself report all these results in full detail to the Society.—M. Ferdinand de Lesseps presented the first volume of a work by the late M. Tissot, the proofs of which were being corrected by the author at the time of his death; the title was '*Exploration Scientifique de la Tunisie.*' According to M. Lesseps the observations of M. Tissot confirmed to the fullest extent the scientific and geographical researches made by Commander Roudaire, who was still advocating his scheme for the creation of an inland sea in Africa. M. Roudaire was about to return shortly to Africa in order to make fresh investigations, but this time it was in connection with the building of a harbour on the Gulf of Gabes. This would be a great boon to all that part of the coast, as there was no shelter for ships along a coast-line of 310 miles (500 kilometres). Operations were to be commenced by effecting soundings, and after it had been found possible to make the harbour, the Government would be asked to make a concession of land for the site, as well as of that immediately surrounding the place decided upon. M. de Lesseps had no doubt that the necessary capital would be raised, at any rate he said sufficient funds had been found to enable M. Roudaire to prosecute the preliminary investigations which he was about to make. It should be stated that this scheme is entirely a private affair. Next spring the speaker would proceed to the Isthmus of Panama, when he would be in a position to open the first 6½ miles (10 kilometres) of the canal from the Atlantic side.—In conclusion, a communication was read from Dr. Neis, naval physician, with reference to his recent explorations in Indo-China. Having started from Saigon on December 12th, 1882, M. Neis ascended the course of the Mekong river as far as the 18th parallel. On arrival at the great bend which the Mekong makes at this point, he left the main stream in order to ascend its affluent the Nam-Chan and endeavour to reach Luang-Prabang across this region hitherto absolutely unknown to Europeans, which bears the name of the country of the Phouens or in Annamite the Principality of Tranninh. At the time of M. Neis's journey these districts were being overrun by Chinese pirates called the Hos, and the traveller, compelled to flee before these freebooters, was forced to return to the Mekong after having abandoned the greater part of his baggage. He then ascended the river again as far as Luang-Prabang where he established himself for eight months, making excursions in various directions, especially along the Nam-Kan, which brought him near the country of the Phouens, and also up the Nam-Du, which he ascended as far as 21° 16' N. lat., a point not far distant from Tongking, where his progress was arrested by the presence of the Hos. Being unable to get back by the east route, he effected his return by way of Siamese Burmah. He first of all ascended the Mekong as far as Xieng-sen and thence passing from the basin of the Mekong to that of the Menam, he proceeded to Xieng-Mai and then on to Lakona, whence he descended on foot to Bangkok, following the course of the Menam. From Bangkok M. Neis started for Chantaboun on the west coast of Siam, and proceeded on foot to Battambang, crossing the plain called the Plain of Sapphires, where more than 4000 Burmese are engaged in searching for these precious stones. Having spent some days in visiting the ruins of Angkor, he crossed the great lake and journeying by way of Phnom-Penh,

he arrived on June 12th at Saigon after an absence of eighteen months. During these travels, which have covered more ground than any journey made up to the present time in Indo-China, Dr. Neis had collected numerous documents, and he intended to stay several months in Paris in order to arrange them.

NEW BOOKS.

(By E. C. RYE, *Librarian R.G.S.*)

EUROPE.

Reyer, [Prof.] E.—Aus Toskana. Geologisch-technische und kulturhistorische Studien. Wien (Carl Gerold's Sohn): 1884, 8vo., pp. iv. and 200, maps and woodcuts.

A series of critical essays on the probable original formation, present physical conditions, geological indications of economical value, &c., of Elba, Monte Catini, Volterra, the Maremma, Val di Chiana, and Ancient Tuscany, with many supplementary and illustrative observations, and special bibliography. The maps are (three) of the geological structure of Monte Catini, and of the secular changes in the course of the Chiana.

Zschokke, [Dr.] Hermann.—Konstantinopel. Eine Fahrt nach dem Goldenen Horn. Würzburg & Wien (Leo Woerl): 1884, 12mo., pp. viii. and 370, map and 31 illustrations from photographs. (*Williams & Norgate*: price 4s. 6d.)

One of Woerl's cheap and instructive series, "Reise-Bibliothek," chiefly to be noticed for the numerous and in most cases good illustrations. The map is of European Turkey, scale 1:3,700,000.

ASIA.

Cumming, [Miss] C. F. Gordon.—In the Himalayas and on the Indian Plains. London (Chatto and Windus): 1884, 8vo., pp. xvi. and 608, illustrations. Price 8s. 6d.

A re-issue in separate form of the Indian portion of the authoress's former work 'From the Hebrides to the Himalayas.'

Kennedy, [Rev.] James.—Life and Work in Benares and Kumaon, 1839–1877. With an introductory note by Sir William Muir, K.C.S.I., &c. London (T. Fisher Unwin): 1884, cr. 8vo., pp. xx. and 392 [no index], illustrations. Price 6s.

Reminiscences of missionary work at Benares and Ranees Khet.

Poljakow, J. S.—Reise nach der Insel Sachalin in den Jahren 1881–1882. Briefe an den Secretär der [Kaiserlichen russischen geographischen] Gesellschaft. Aus dem Russischen übersetzt von Dr. A. Arzruni. Berlin (A. Asher & Co.): 1884, 8vo., pp. iii. and 134. (*Dulau*: price 4s.)

Poliakoff, one of the conservators of the Zoological Museum of the Imperial Academy of Sciences at St. Petersburg (already known from his having worked up Prejevalsky's collections), was sent by the Russian Geographical Society in 1881–82 to Saghalien; and in these letters to the secretary of that society he gives an account of his experiences, with a sketch of the physical geography and products of the island. The capabilities of the Tym Valley receive special attention.

[Punjab Gazetteers.]—Gazetteer of the Amritsar District, pp. viii., 78, and xxvi.; Bannu District, pp. xiv., 229, and xxv.; Delhi District, pp. xii., 215, and xxvi.; Dera Ghazi Khan District, pp. xiv., 146, and xxv.; Gujrat District, pp. vi., 122, and xxv.; Jalandhar District, pp. iv., 77, and xxiv.; Jhang District, pp. vi., 171, and xxv.; Jhelam District, pp. xli., 165, and xxiv.; Montgomery District, pp. viii., 186, and xxiv.; Mooltan District, pp. viii., 178, and xxviii.; Muzaffargarh District, pp. vi., 143, and xxv.; Pesháwar District, pp. xii., 231, and xxvi.; Rohtak District, pp. x., 149, and xxiv.; Sháhpur District, pp. x., 111, and xxv. 1883-4. Compiled and published under the authority of the Punjab Government; the first 4, the 8th, and last 3, Calcutta (Central Press Co.); the rest, Lahore (Arya Press): 1884, 8vo.

For the above mentioned 14 volumes, the Society is indebted to the liberality of H.M. Secretary of State for India in Council. No editor's name appears, but from the preface of every volume it appears that the base of each is the Settlement Report of the officers of the district, supplemented by passages from a draft Gazetteer compiled between 1870 and 1884 by Mr. F. Cunningham, and by material obtained from the Deputy Commissioner, and the Census Report.

Various minor sources of authority and revision are duly acknowledged. Each volume is divided into 6 parts:—The District, History, the People, Production and Distribution, Administration and Finance, and Towns, Municipalities, and Cantonments (not an alphabetical list as usual in Gazetteers). Appendices on various points of economical interest are often added, and statistical tables complete each volume. The "District" part is in most cases subdivided under "Descriptive," and "Geology, Fauna, and Flora," comprising the natural physical features and products of each. There is no index.

Reuleaux, [Prof.] F.—Eine Reise quer durch Indien im Jahre 1881. Erinnerungsblätter. Berlin (Allgemeiner Verein für Deutsche Literatur): 1884, 8vo., pp. xvi. and 288, illustrations. (*Williams & Norgate*: price 7s.)

Reminiscences of Calcutta, Benares, Agra, Delhi, Bombay, and Ceylon, of no geographical value.

Rivoyre, Denis de.—Les Vrais Arabes et leurs pays. Bagdad et les Villes ignorées de l'Euphrate. Paris (Plon): 1884, 12mo., pp. 320, map and illustrations. (*Dulau*: price 4s.)

Of the usual French type of light travel. The map (scale 1:4,800,000) covers Mesopotamia and Western Persia.

Stapfer, Edmond.—La Palestine au temps de Jésus-Christ, d'après le Nouveau Testament, l'Historien Flavius Josèphe, et les Talmuds. Paris (Librairie Fischbacher): 1885 [1884], 8vo., pp. 531, map, plans, &c. (*Dulau*: price 7s. 6d.)

In this series of studies upon the social and religious life of the Jews of the first century of the Christian era, the author especially discusses the geography of the Gospels, illustrating the subject by a physical map of Palestine (scale 1:1,000,000), with insets of Jerusalem and the territorial disposition of the twelve tribes.

AFRICA.

James, F. L.—The Wild Tribes of the Soudan. An account of personal experiences and adventures during three winters spent in that country, chiefly among the Basé tribe. Second edition, with an account of the routes from Wady Halfah to Berber, by the author; and a chapter on Khartoum and the Soudan by Sir Samuel Baker. London (John Murray): 1884, cr. 8vo., pp. xxxiv. and 265, map and illustrations. Price 7s. 6d.

The added prefatory chapter by Sir Samuel Baker is mostly political. Mr. James's own addition occupies pp. 230-257, and will be found of especial

interest at the present time. His experiences were early in 1878. The book is published in his absence, as he has again started for Berberah (which he visited last year), from which point he proposes to penetrate into the Somali country, spending the present winter in exploring parts hitherto unknown.

Little, [Rev.] Henry W.—Madagascar: its history and people. Edinburgh & London (W. Blackwood): 1884, post 8vo., pp. viii. and 356, map. Price 10s. 6d.

The author has resided for some ten years at Andévoranto on the east coast, and gives the results of personal observations as well as matter collected from the private journals of others, and the works of Ellis and Sibree.

Noirot, Ernest.—A travers le Fouta-Diallon et le Bambouc (Soudan Occidental). Souvenirs de Voyage. Paris (Maurice Dreyfous) [1884] 8vo., pp. 361, map, illustrations. (*Dulaud*: price 3s. 9d.)

The author accompanied Dr. Bayol on his mission to the Peulhs or Fulahs, in 1881, and ascended the Rio Nunez to Doko, from which he struck eastwards to Timbo, eventually reaching Senegal at Medine via Labé. The illustrations are very roughly executed, from his own sketches; the map shows the routes, on the scale of 1 : 350,000.

Ruckert, [Dr.] K. Th.—Nach Nord-Afrika. Nach seinen Tagebuch geschildert von Dr. K. Th. Rückert. Würzburg & Wien (Leo Woerl): 1884, 12mo., pp. xii., 548, and index viii., map and 21 illustrations from photographs. (*Williams & Norgate*: price 5s.)

One of Woerl's series, "Reise-Bibliothek," based on the author's diary during a tour in Italy, Corsica, Sardinia, Tunis, Carthage, Malta, Sicily, &c. Some of the landscape illustrations are good. The map is of Southern Europe and North Africa, scale 1 : 6,000,000.

Speedy, Mrs. [Cornelia Mary].—My Wanderings in the Soudan. London (Richard Bentley & Sons): 1884, 2 vols., post 8vo., pp. xvi. and 239, x. and 264, map and illustrations. Price 21s.

The authoress accompanied her husband, Captain Speedy, in 1878, on a shooting tour practically covering the same ground as that described in Mr. F. L. James's book, viz. from Suakim to Kassala, with a detour to the Settite and the Basé country. The return differs from Mr. James's route, as it was made by the Barca or Baraka, parallel to the Suakim and Kassala road, striking the coast-line at Tokar.

AMERICA.

Bonaparte, [Prince] Roland.—Les Habitants de Suriname. Notes recueillies à l'Exposition Coloniale d'Amsterdam en 1883. Paris (Quantin): 1884, large folio, pp. viii. and 227, maps, 61 phototypes, 13 coloured pls., and minor illustrations.

This admirably illustrated anthropological work (for a copy of which the Library of the Society is indebted to the liberality of its illustrious author) commences with a geographical, statistical, and historical sketch of the Dutch Colony of Surinam, extending over 44 pages, and elucidated by two maps, one of the whole colony, on the scale of 1 : 1,250,000, coloured to show cultivated lands, gold workings, savannahs, forests, &c., the other of the littoral region, on the larger scale of 1 : 500,000, coloured in like manner, but with more details. Bibliographical references are given (pp. 3 and 4), to 22 sources of information. The chief features of the indigenous flora and fauna are indicated. The statistics show a population on January 1, 1883, of 64,653, of whom 5657 were Europeans (676 only), garrison, marine, and immigrants; the remainder being negroes and Indians. The immigrants are 4475, all except 47 from the British Indies. The

exportation of gold appears to have rapidly increased since 1876, having reached a value of nearly 66,000*l.* in 1882.

It is, however, to a discussion of the physical structure, habits, languages, and ethnological affinities of the Surinam Indians that the bulk of the work is devoted, the material having been chiefly found in the individuals of different tribes who were exhibited at Amsterdam in 1882. A very sensible explanation of the peculiar custom known as the "couvade" is given, to the effect that its object was to keep the husband in the hut at a time when his wife had most need of his assistance.

Cole, George R. Fitz-Roy.—*The Peruvians at home.* London (Kegan Paul, Trench & Co.): 1884, cr. 8vo., pp. xix. and 277. Price 6*s.*

The author's visit was in 1873.

Hamilton, Leonidas Le Cenci.—*Hamilton's Mexican Handbook; a complete description of the Republic of Mexico, its Mineral and Agricultural Resources, Cities and Towns of every State, Factories, Trade, Imports and Exports, how legally to acquire property in Mexico, how to transact business under Mexican Laws, Railroads and Travelling in the Republic, Tariff Regulations, Duties, &c., and a Commercial Directory of the Principal Business Men of Mexico; combining practical information for ready reference by the Merchant, Miner, Real Estate Investor, Railroad builder, Mining Engineer and Locator, Traveller and Settler.* London (Sampson Low & Co.): 1884, 8vo., pp. 281 and xiii., illustrations. Price 8*s.* 6*d.*

The very full title sufficiently explains the scope of this practical work, which may be mentioned here on account of the dearth of accessible information in English on the Republic of Mexico as a whole. It appears to be an enlarged revision of the author's 'Border States of Mexico' published originally at San Francisco in 1881, and which has run through four editions. Some slight attempt is made to sketch the physical features of the Republic, and the boundaries, climate, products, &c., of the different states are also given, in some cases with topographical detail, a short special chapter being devoted to the climate of the table-lands of the northern part of Mexico. The minerals receive particular attention, and extracts are given from reports of mining surveyors inaccessible to the general public, and from the published accounts of travellers. The population is estimated at 9,525,000, including Lower California: this is based upon the work of Antonio Garcia Cubas in 1876. Much general information is scattered through the book, the utility of which would have been materially improved by the addition of an index. The illustrations, which chiefly represent the principal cities, are passably good.

Mandat-Grancey, [Le Baron] E. de.—*Dans les Montagnes Rocheuses.* Paris (Plon): 1884, 16mo., map, illustrations. (*Dulau*: price 4*s.*)

A reprinted collection of articles in the Paris newspaper *Le Correspondant*, containing a lively description of the author's rambles in the Western States of North America. Besides the usual tourist's map, a special one is given of the Black Hills of Dakota (scale 8 miles to the inch), giving the country round Deadwood, the chief scene of Baron Mandat-Grancey's experiences.

Stoll, [Dr.] Otto.—*Zur Ethnographie der Republik Guatemala.* Zürich (Orell Füssli & Co.): 1884, 8vo., pp. ix. and 176, map. (*Williams & Norgate*: price 6*s.*)

The ethnographical results of a residence during many years in different parts of the Republic. Eighteen different dialects are distinguished as now existing in Guatemala, of which the Maya, Mopan, Chol, Qu'ekchi, Pokonchi, Uspanteca, Ixil, Aguacateca, Mame, Quiché, Cakchiquel, Tz'utujil, Pokomam, and Chorti belong to the Maya-Quiché group; and the Sinca, Pupulaca, Pipil, and Caribe are not allied to the Maya, but represent other types. An ethnographical map of the Republic is given.

GENERAL.

Carraro, [Prof.] Giuseppe.—Memoriale del Geografo, ossia Dizionario Universale compendiato di Geografia antica e moderna, Astronomico, Fisico, e Politico. Firenze (Barbèra): 1884, sm. 8vo., pp. x. and 1232. (*Dulau*: price 6s. 6d.)

A gazetteer of avowedly restricted aim, including references to people as well as places. A list of the Italian communes with populations is added, ending at part of the letter L, the remainder (results of 1881 census) having been received in time for incorporation in the text.

Cortambert, Richard.—Nouvelle Histoire des Voyages et des Grandes Découvertes Géographiques dans tous les temps et dans tous les pays. L'Amérique—Le Pole Nord. Paris (Marpon & Flammarion): [1884], gr. 8vo., pp. 808, illustrations. (*Dulau*: price 21s.)

The commencement of a popular series, the larger illustrations of which are especially bad.

Markham, Clements R.—The Sea Fathers: a Series of lives of Great Navigators of former times. London (Cassell & Co.): 1884, post 8vo., pp. viii. and 221, frontispiece. Price 2s. 6d.

Lectures delivered before the cadets of the training ships *Worcester* and *Conway*, on Prince Henry the Navigator, Columbus, Sebastian del Cano, the Dutch navigators, Sebastian Cabota and Sir Francis Drake, the East India Company, Hudson and Baffin, William Dampier and Cook, Scoresby and Dance. Notes on authorities are added in an appendix. In the chapter on the East India Company, the fact of Edward Wright of Norfolk having first described and applied the principle of Mercator's projection is emphasised; this has of course been often before recorded, but is apparently not generally known.

NEW MAPS.

(By J. COLES, *Map Curator* R.G.S.)

EUROPE.

ORDNANCE SURVEY MAPS.

Publications issued from 1st to 30th September, 1884.

6-inch—County Maps:—

ENGLAND: **Buckinghamshire** (part of): Sheets 28; 29 with parts of 16, 17, 24, 25 (Hertfordshire); 2s. 6d. each. **Hertfordshire** (part of): 12; 26 with parts of 34 (Bedfordshire) and 30, 35 (Buckinghamshire); 2s. 6d. each. **Oxfordshire** (part of): 21; 28 with 26 (Buckinghamshire); 2s. 6d. each. Quarter sheets: **Bedfordshire** (part of): 12 N.W.; 24 N.W., 24 N.E.; 1s. each. **Cornwall** (part of): 1 N.E.; 4 N.W.; 11 N.W.; 13 N.E.; 1s. each. **Devonshire** (part of): 27 S.E.; 38 N.E.; 63 N.W.; 74 S.E.; 75 N.E.; 76 N.W.; 77 N.W.; 105 S.W.; 1s. each. **Gloucestershire** (part of): 43 N.W., 43 N.E.; 47 N.E.; 1s. each. **Leicestershire** (part of): 8 S.W.; 14 N.E.; 20 S.W.; 21 S.W. with 2 S.W. (Rutland), 21 S.E. with 2 S.E. (Rutland); 22 S.E.; 25 N.W.; 27 N.W., 27 N.E. with 4 N.E. (Rutland), 27 S.E. with 4 S.E. (Rutland); 1s. each. **Norfolk** (part of): 22 N.E.; 42 N.W., 42 S.W.; 46 N.W., 46 N.E., 46 S.W.; 54 S.W.; 60 N.E.; 69 N.E.; 70 N.W.; 88 S.E.; 1s. each. **Northamptonshire** (part of): 36 N.E.; 38 N.W., 38 N.E., 38 S.W., 38 S.E.; 1s. each. **Nottinghamshire** (part of): 23 S.E.; 24 N.W., 24 N.E.; 25 N.W., 25 S.W.; 29 N.E.;

32 N.W. with 41 N.W. (Derbyshire); 33 N.W.; 1s. each. **Shropshire** (part of): 4 S.W.; 8 N.E.; 9 N.E.; 13 S.E.; 14 N.E., 14 S.W.; 15 N.E.; 19 S.W., 19 S.E.; 20 N.E., 20 S.E.; 21 N.W., 21 S.E.; 22 S.E.; 61 S.W. with 44 S.W. (Montgomeryshire); 68 N.W. with 49A N.W. (Montgomeryshire); 77 S.W. (with 2 S.W. Herefordshire and 12 S.W. Radnorshire); 1s. each. **Somersetshire** (part of): 10 S.W.; 14 N.E., 14 S.E.; 18 N.W., 18 N.E.; 21 S.E.; 30 N.W., 30 N.E.; 31 N.W.; 1s. each. **Staffordshire** (part of); 39 N.W.; 59 S.E. with 2 S.E. (Warwickshire); 69 N.W. with 8 N.W. (Warwickshire); 1s. each. **Suffolk** (part of): 7 S.W. with 93 S.W. (Norfolk); 17 N.W. with 107 N.W. (Norfolk); 31 S.E. with 36 S.E. (Cambridgeshire); 39 N.E.; 40 N.W.; 44 S.W., 44 S.E.; 47 S.E.; 54 N.E., 54 S.W.; 55 N.W., 63 N.W., 63 N.E., 63 S.E.; 65 N.W., 65 N.E.; 82 N.W., 82 N.E.; 1s. each. **Worcestershire** (part of): 9 S.E.; 10 N.E.; 19 N.W.; 27 S.W.; 31 S.E.; 32 N.E., 32 S.E.; 33 N.W.; 34 N.W.; 48 S.E. with 5 S.E. (Gloucestershire); 49 N.W. with 6 N.W. (Gloucestershire); 1s. each.

IRELAND: **Meath** (revised), sheets 24, 26.

25-inch—Parish Maps:—

ENGLAND: **Bedford**: Area Books of the following parishes:—Blunham, Cardington, Moggerhanger, Renhold, Tempsford, Turvey, Willington. **Cornwall**: Area Books of the following parishes:—Advent, Egloskerry, Forrabury, Laneast, Lanteglos, Lezant, Lewannick, Minster, South Hill, St. Cleer, St. Clether, St. Dominick, St. Mellion, Tresmeer, Trewen, Trevalga. **Gloucester**: Area Books of the following parishes:—Aston Blank, Chedworth, Colesborne, Compton Abdale, Frocester, Hampnett, Hazleton, Kempley, Kingscote, Naunton, Notgrove, Preston, Rendcombe, Stowell, Sherborne, Turkdean, Yanworth. **Leicester**: Heather, Area Book. **Norfolk**: Area Books of the following parishes:—Beeston St. Andrew, Besthorpe, Cranworth, Drayton, Eccles, East Bradenham, Hoe, Horsford, Horsham, St. Faith with Newton St. Faith, Larling, Letton, New Buckenham, Roudham, Shipdham, Shotesham St. Mary, Spixworth, Tasburgh, Taverham, Watton. **Shropshire**: Alveley, 14 sheets; Billingsley, 5 sheets; Frodesley, Ar. Bk.; Highley, 8 sheets; Longmoor, Ar. Bk.; Lydham, Ar. Bk.; More, Ar. Bk.; Norbury, Ar. Bk.; Romsley, 6 sheets; Willey, Ar. Bk. **Stafford**: Armitage, Ar. Bk.; Croxall, Ar. Bk.; Farewell and Chorley, Ar. Bk.; Freeford, 3 sheets; Fullen, 2 sheets; Hanbury, Ar. Bk.; Haselour, Ar. Bk.; Penkridge, 31 sheets; St. Chad, St. Mary, The Close, The Friary, and Farewell and Chorley (Det.) (Re-survey), 9 sheets; St. Michael (Re-survey), 26 sheets. **Suffolk**: Area Books of the following parishes:—Ampton, Culford, Easton Bavents, Great Livermere, Henham, Hengrave, Heveningham, Honington, Lackford, Little Livermere, Reydon, Sotherton, South Cove, Southwold, Sweffling, Troston, Wangford, (Eastern Division), Wordwell, Yoxford. **Worcester**: Hagley, Ar. Bk.

Town Plans:—5 feet scale:—

IRELAND: Belfast (revised), sheets 36, 43, 55. Cavan (revised), sheets XX., 88, 98.

ASIA.

Indian Government Surveys:—

Bombay Presidency:—Trigonometrical Branch, Survey of India. Cutch. Scale 1 inch to 1 mile. Sheet No. 1. Season 1882–83. No. 2. Season 1882–83. No. 6. Season 1882–83. No. 7. Season 1882–83. Nos. 8 and 9. Season 1882–83. No. 23. Seasons 1881–82 and 1882–83.—Deccan Topographical Survey. Scale 2 inches to 1 mile. Sheet No. 4. N.W., N.E., S.W., S.E. Seasons 1873–74, and 75. District Nasik. No. 40. N.W., N.E., S.W., S.E. Districts Satara and Kolaba. Seasons 1875–76. No. 41. N.W., N.E., S.W., S.E. Districts Poona and Satara. Season 1874–75. No. 47. N.W., N.E., S.W., S.E.

District Satara. Season 1875-76. No. 48. N.W., N.E., S.W., S.E. Districts Satara, Sholapur, and Poona. Seasons 1877-78. No. 52. N.W., N.E., S.W., S.E. District Satara. Season 1876-77. No. 53. N.W., N.E., S.W., S.E. Districts Satara and Sholapur. Season 1878-79.—Khandesh and Bombay Native States Topographical Survey. Scale 1 inch to 1 mile. Sheet No. 42 (Part of Khandesh and Nizam's Dominions). Season 1882-83.—**Bengal Presidency**: District Bancoorah, Bengal. Scale 4 miles to an inch. Taken from Sheets Nos. 113 and 114 of the Atlas of India. Revenue Survey of 1854 to 57, and 62 to 67.—Bengal, Eastern and Western. Scale 8 miles to an inch. 16 sheets, 5th issue with corrections to 1883.—Bhopal and Malwa Topographical Survey. Scale 1 inch to 1 mile. Sheet No. 49 (Parts of Banswara, Partabgarh, Gwalior, and Oodeypore). Season 1882-83.—The Central Provinces, 1881. 16 miles to an inch. 2 Sheets (2nd issue), 1884.—Central India and Rajputana Topographical Survey. 1 inch to 1 mile. Sheet No. 96 (Parts of Jodhpore and Sirohee). Seasons 1881-82-83.—District Chittagong, Bengal. 4 miles to an inch. Taken from sheets Nos. 126, 127, and 128 of the Atlas of India. 2 sheets, published 1884.—District Furreedpore, 1851-52 and 1854-60. 4 miles to an inch. Taken from sheets Nos. 120, 121, 126, and 127 of the Atlas of India.—District Jubbulpore 1854 to 62 and 1866-67. 4 miles to 1 inch. Taken from sheets Nos. 70 S.E., 71 N.E., and 71 N.W., and 89 and 90 N.W., published 1884.—Khasi, Garo, and Naga Hills Topographical Survey. 1 inch to 2 miles. Sheet No. 107 (fourth edition). Part of Naga Hills. Seasons 1874-76.—District Lakhimpur, Assam. 4 miles to 1 inch. Taken from sheets Nos. 129, 130, and 168 of the Indian Atlas. Published 1884.—North-West Provinces Survey. 2 inches to 1 mile. Sheet No. 5 N.W., N.E., S.W., S.E. Districts Muzaffarnagar and Meerut. Seasons 1878-79 and 80. No. 6. N.W., N.E., S.W., S.E. Districts Muzaffarnagar and Meerut. Seasons 1879-80-81. No. 7. N.W., N.E., S.W., S.E. District Meerut. Seasons 1879-80-81. No. 19. N.W., N.E., S.W., S.E. Districts Meerut and Bulandshahr. Season 1881-82. No. 20. N.W., N.E., S.W., S.E. District Bulandshahr. Season 1881-82. No. 32. N.W., S.W., S.E. Districts Meerut and Bulandshahr. Season 1881-82. No. 33. N.W., N.E., S.W., S.E. District Bulandshahr. Season 1881-82.—North-West Provinces Survey. Scale 1 inch to 1 mile. Sheet No. 19. Districts Meerut and Bulandshahr. Season 1881-82. No. 20. District Bulandshahr. Season 1881-82. No. 33 (Western portion). District Bulandshahr, 1881-82. No. 63. District Tarai. Seasons 1850-51 and 1873-75. No. 64. Districts Moradabad, Tarai, and Rampur State. Seasons 1850-51, 1864-65, and 1871-76. No. 70. District Budaun. Season 1877-78. No. 85. District Budaun. Season 1877-78. No. 112. District Banda. Season 1874-78. Nos. 125, 126, 127, 128, 141, 143, 155, 156. District Banda. Seasons 1875-79. Nos. 165, 166, 167, 179, 181, 195. District Jaunpur. Seasons 1877-81.—Oudh Revenue Survey. 1 inch to 1 mile. Sheet No. 105. Districts Hardoi and Unao. Seasons 1860-64. No. 106. District Unao. Season 1860-64. No. 123. Districts Rae Bareilly and Unao. Season 1861-62. No. 166. District Partabgarh. Seasons 1859-61.—District Sylhet (Preliminary Issue). 1860-66. Scale 4 miles to an inch. Taken from Sheets Nos. 125 and 126 of the Atlas of India. Revenue Survey of 1860-66.—British Burma Survey. Sheet No. 133 (N.W.), (N.E.), (S.W.), (S.E.). District Hanthawaddy. Season 1881-82. Scale 2 inches to 1 mile.

Indices:—Index Chart of the Cutch Topographical Survey (1 inch to 18 miles).—Index to the sheets of the Deccan and Konkan Topographical Survey (1 inch to 32 miles).—Index to the sheets of the Map of Bengal, on the scale of 8 miles to an inch (64 miles to 1 inch).

AFRICA.

Afrika.—Politische Übersichtskarte von—. Nach den neuesten Forschungen und Reise-Ergebnissen berichtigt und ergänzt von Heinrich Kiepert. (Separat-Ausgabe aus dem Hand-Atlas über alle Teile der Erde. No. 33.) Scale 1:20,000,000 or 275·3 geographical miles to an inch. D. Reimer, Berlin, 1884. (*Dulau.*)

Afrique Occidentale Carte de l'—. Ministère des Travaux Publics. Commission Supérieure pour l'étude de la mise en Communication par voie ferrée de l'Algérie et du Sénégal avec l'intérieur du Soudan. Scale 1:5,000,000 or 66·6 geographical miles to an inch. Gravé par P. Méa. Paris. Price 8s. (*Dulau.*)

This map would seem to be based on the "Carte des parties Centrales du Sahara," published by the Dépôt de la Guerre in 1862. It is drawn on the same natural scale, but contains numerous corrections and additions more especially with regard to the plateaux of the Sahara, the routes, and the results of surveys made by French officers in Senegal and Bambouk towards the sources of the Niger. The line of the proposed railway from Mediné to Bammaku is shown, and all French stations along the line of communication between St. Louis (Senegal) and Bammaku on the Niger. An inspection of this map shows that this railway is already completed as far as Bafulabe, situate at the junction of the Baule river with the Senegal.

It is worthy of note that the only boundaries completely laid down in this map are those of Tunis and the Republic of Liberia; those of the British and French possessions being only shown in parts. There are many notes with reference to the physical features of the country, its fertility, limits of tropical rains, and inhabitants.

An inset map contains an index of the fourteen authorities from whose works this map has been chiefly compiled.

Ambukol and Shendy.—Sketch of country between —. Taken from the survey of Mr. John Fowler, C.E., to which is added descriptive Notes of the Route. Scale 1:200,000 or 2·7 geographical miles to an inch. Lithographed at the Intelligence Branch, War Office, London, 1884.

Egypt and the Soudan.—Map of—. Scale 1:2,854,868 or 39 geographical miles to an inch. W. & A. K. Johnston, Edinburgh and London, 1884.

This map is divided by red lines into squares 100 miles in length and breadth, which arrangement will greatly assist those who are unaccustomed to estimate distances on maps. The routes of Generals Hicks, Baker, and Gordon are also laid down, and there is also a map of Egypt on a reduced scale showing its boundaries.

Kuango-Expedition.—Karte der—, aufgenommen, entworfen und gezeichnet vom Führer derselben, dem Major Alexander von Mechow. 26 Blätter (1 Uebersichtskarte und 25 Sectionen). Scale 1:81,200 or 1·1 geographical miles to an inch. Berlin: A. Asher & Co., 1884. Price 3l. (*Asher.*)

This is a very detailed map of the country within an average distance of six miles on either side of Major von Mechow's route. The scale is so large as to necessitate the use of an index map which is given by the author, and it is astonishing how so large an area could, under the existing circumstances, have been surveyed in such detail as we find laid down in the map.

As the development of trade in the Congo basin has of late attracted so much attention, this map of the country in the immediate vicinity of its largest southern affluent will doubtless be of great value to all interested in the opening up of this territory to scientific research and commercial enterprise.

Libye Intérieure, Partie Occidentale. Routes de commerce des Anciens, d'après Ptolémée. Lyon, le 29 Juin 1884. E. F. Berlioux. Société de Géographie, Paris.

Niger-Benné-Gebiete.—Vorläufige Übersicht von Eduard Robert Flegel's Routen im—. 1879-1884. Scale 1 : 3,000,000 or 41·6 geographical miles to an inch. Red. v. Richard Kiepert.—Verhandlungen der Ges. für Erdkunde zu Berlin, Bd. xi. No. 8. Berlin : Dietrich Reimer, 1884. (*Dulau.*)

Nile Provinces from the Third Cataract (Hannek) to Khartum, Map of the—. Scale 1 : 1,013,760 or 13·9 geographical miles to an inch. With an inset plan of Khartum and environs. Compiled and lithographed at the Intelligence Branch, War Office, London, under the direction of Major W. R. Fox, R.A., D.A.Q.M.G., 1884.

Nile from Wady Halfa to Khartum.—Sketch Map of—. With notes on Caravan Routes, Navigability of Nile, Towns, Climate, &c. Scale 1 : 1,013,760 or 13·9 geographical miles to an inch. Revised in accordance with Commander Hammill's Report 27-6-84. Lithographed at the Intelligence Branch, War Office, May 1884.

This map contains a very large amount of useful information for travellers with reference to the state of the Nile at certain seasons. It gives the population, the temperatures, and distances between different points; it also describes the desert routes, where wells are situate, or water to be found, and many other facts most useful to any one visiting the Nile Region.

Nile (the), Egypt, and the Soudan, by James Wyld. Scale 1 : 1,230,000 or 16·8 geographical miles to an inch. Published by J. Wyld, London. (Egyptian Series No. 11.)

———. Scale 1 : 2,025,000 or 27·7 geographical miles to an inch. Published by J. Wyld, London. (Egyptian Series No. 12.)

West-Aequatorial-Afrikas, Karte——, zur Veranschaulichung des Deutschen Colonialbesitzes. Auf Basis englischer und französischer Admiralitätskarten und unter Berücksichtigung der Karten von Dradier-Bulfy, Comber, Greenfell, Rogozinski, Hassenstein und Anderen, von L. Friederichsen, Hamburg, 1884. Scale 1 : 710,000 or 10·6 geographical miles to an inch. Price 1s. 6d. (*Stanford.*)

This map, though very roughly produced, answers the purpose for which it was published sufficiently well. It is intended to show the districts claimed by the several European Nations on the Slave Coast and as far South as the Equator. A statistical table is given of positions and numbers of the German factories in Equatorial Africa north of the Equator; together with the names and addresses of the firms to whom they belong.

The Slave Coast is shown in an inset map on an enlarged scale.

West-Afrika.—Die Deutschen Besitzungen in—. Von B. Hassenstein. Justus Perthes, Gotha, 1884. Price 1s. (*Dulau.*)

This sheet contains eight maps, the principal of which shows the number and extent of the German Possessions on the south-west of Africa between Walvisch Bay and Namaqua-Land; these include all the country lying between the 26th parallel of south latitude and the right bank of the Orange River, as well as Spencer Bay, in lat. 25° 40' S., and Sandwich Harbour in latitude 23° 23' S. An enlarged plan of Angra Pequena, with soundings marked, is given.

The inset maps show the other German possessions as extending from the Itemo River in lat. 2° 20' N. to Mondoleh Island situate north of the entrance to the Cameroons River, extending in the interior still farther north to lat. 4° 5' N. On the Slave Coast the territory of Togno, extending from Ajudo on the east to Afahu on the west, is also coloured as a German possession, this includes Little Popo, Porto Seguro, and Lome. The following is a list of the maps:—

Gros-Namaqua-Land und das Gebiet des Hauses F. A. Lüderitz. Hauptsächlich nach Th. Hahn. Scale 1:1,750,000 or 23·9 geographical miles to an inch.

Die Thüringischen Fürstenthümer im Massstab d. Hauptkarte. Scale 1:1,750,000 or 23·9 geographical miles to an inch.

Kamerún, Bimbia and Malimba. Scale 1:800,000 or 10·9 geographical miles to an inch.

Das Gebiet von Bimbia. Scale 1:150,000 or 2 geographical miles to an inch.

Die Sklavenküste mit dem am 6 Juli in Deutschen Besitz genommenen Gebiet von Tognó. Scale 1:2,000,000 or 27 geographical miles to an inch.

Übersicht der Europäischen Kolonien an der Guinea-Küste sowie des Gebietes der Internationalen Kongo-Gesellschaft. Scale 1:12,500,000 or 171·2 geographical miles to an inch.

Plan von Angra-Pequena mit der Besitzung des Hauses F. A. E. Lüderitz in Bremen. Scale 1:175,000 or 2·3 geographical miles to an inch.

Afrika. Scale 1:100,000,000 or 1370 geographical miles to an inch.

Westafrikanische Küste, Die, von Accra bis zum Ogowe (Meerbusen von Guinea). Scale 1:3,000,000 or 41·6 geographical miles to an inch. Mit Carton: Umgegend des Camerun-Gebirges in W. Afrika. Scale 1:1,000,000 or 13·6 geographical miles to an inch. Richard Kiepert. D. Reimer, Berlin, 1884. (*Dulau.*)

West and South-West Coast of Africa, Map of—, showing the Territories claimed by European Powers. Scale 1:6,000,000 or 82·1 geographical miles to an inch. Issued by authority of the African Association, Liverpool, January 1884. George Philip & Son, London and Liverpool.

This is an outline sketch of the West Coast of Africa extending from latitude 17° 30' N. to 17° 30' S. The object in publishing this map is to show at a glance the portions of the coast held by European Powers. A statistical table is given in which the extent and description of the trade, and the nationality of the principal European traders, is set forth, and for this purpose the coast-line is divided into eleven sections; it also points out those places where, in the opinion of the African Association, British Consuls are urgently needed. The courses of rivers are shown, but there is no hill-shading to indicate the topographical features of the country. The map, however, fulfils the purpose for which it was evidently published, and cannot fail to be interesting to all engaged in West African trade.

CHARTS.

Admiralty.—Charts and Plans published by the Hydrographic Department, Admiralty, in July, August, September, and October, 1884.

No.		Inches.	
1118a, b	m =	0·75	Scotland, north coast:—Shetland isles, 2 sheets (plans, Balta sound. Approaches to Scalloway. Bressay sound or Lerwick harbour). Price 2s. 6d. each.
1	d =	2·1	British Islands to Mediterranean Sea. Price 2s. 6d.
1646	m =	3·0	Bay of Bengal, gulf of Martaban:—Maulmain harbour. Price 1s.
654	m =	0·05	Arctic Sea:—Bering Strait. Price 2s. 6d.
598	m =	0·19	China, east coast:—Ji-tsin-ho to Ning-hai (plans, Lan-mu-ho entrance. Ching-ho entrance. Peh-tang-ho entrances. Chi-ho entrance. Tai-cho-ho and Yang-ho entrances). Price 2s. 6d.
1354a, b	m =	0·8	South Atlantic Ocean:—Falkland islands (2 sheets). 2s. 6d. each.

No.	Inches.		
1335			Plan added, Lobos de Afuera.
14			New plan, Port Sawakin.
1384			Plan added, Akyab.
1194	m	= 6·0	Spain, south coast :—Cartagena harbour. Price 1s. 6d.
856	{ m	= 4·0	South Pacific ocean :—Anchorages in New Hebrides islands. Tomman or Uru island. Craig cove. Yemyu cove. Foreland anchorage. Nelson bay. Diamond bay. Price 1s. 6d.
	{ m	= 6·0	
867	m	= 1·4	Bermuda islands :—The Narrows to Ireland island. Price 1s.
498	m	= 2·0	Australia, east coast :—Port Molle and Molle channel. Kenedy sound. Price 1s. 6d.
858	m	= 1·5	Australia, west coast :—Roebeck bay. Price 1s. 6d.
40	m	= 8·1	India, west coast :—Karachi harbour. Price 2s. 6d.
1444	m	= 5·0	Scotland, east coast :—Montrose harbour. Price 1s.
81	m	= 0·4	Red sea :—Mersa Durár to Trinkitat, showing the approaches to Sawákin. Price 2s. 6d.
1052	m	= 0·14	Australia, north-west coast :—Hall point to cape Bertholet, including King sound and the Buccaneer archipelago. Price 1s.
2460	North-west Pacific :—Kamchatka to Kodiak island, Bering strait. Price 2s.		
805	South America, Magellan strait :—Harbours and anchorages. Sylvia cove. Sylvia channel. Baker cove. Rocky inlet. Marsh basin. Cripples channel. Field anchorage. Havergal. Price 2s.		
219	Plan added. Kluang bay.		
135	Plans added. Tomari Ura. Kata Ura.		

(J. D. Potter, agent.)

CHARTS CANCELLED.

No.	Cancelled by	No.
1118	Shetland Isles { New charts, Shetland Isles, 2 sheets	1118a, b
1	British islands to Mediterranean sea { New chart, British islands to Mediterranean sea	1
1646	Maulmain harbour	New plan, Maulmain harbour .. 1646
1354	Falkland islands { New charts, Falkland islands, 2 sheets	1354a, b
1194	Cartagena harbour	New plan, Cartagena harbour .. 1194
40	Karachi harbour	New plan, Karachi harbour .. 40
1444	Montrose harbour	New plan, Montrose harbour .. 1444
2460	Kamchatka to Kodiak island .. { New chart, Kamchatka to Kodiak island	2460
1051	Camden bay to Vansittart bay.	

CHARTS THAT HAVE RECEIVED IMPORTANT CORRECTIONS.

No. 2544. South America, east coast :—Rio de la Plata. 2540. New Zealand, Middle island :—Awarua or Bluff harbour and New river. 2220. Black sea :—Ports and anchorages on south shore of the Black sea. 2368. Baltic sea, coast of Prussia :—Jershoft light to Rixhoft. 214. South Pacific ocean :—Solomon islands. 2250. Baltic sea :—Gottland island. 625. Africa, west coast :—Congo river. 2313. Norway, west coast :—Andö to Helgö. 2369. Baltic sea, coast of Prussia :—Rixhöft light to Bruster-ort. 641. Africa : south-east coast. 2377. Baltic sea :—Ports on

the east coast of Sweden. 2150. Baltic sea :—Femern to Bornholm. 190. Sicily :—Girgenti and Catania. 2454. Philippine islands :—Luzon island, northern portion. 2312. Norway, west coast : Lofoten islands to Andö. 1640. South Pacific ocean :—Marquesas islands. 530. South America, east coast :—Victoria to Sta. Catharina. 2224. Baltic sea, Gulf of Finland :—Helsingfors and Sveaborg. 2251. Sweden, east coast :—Kalmar Sund and Oland. 14. Red sea :—Anchorage in. 1335. South America, west coast :—Chicama river to port Payta. 1324. South America, east coast :—Rio de la Plata to Rio Negro. 2411. New Zealand :—Otago harbour. 679. Madagascar :—Looke, Leven, Andrava, and Vohemar bays. 94. Amphitrite islands :—Tihen-pien or Tien-pack harbour. 1577. North America, west coast :—Columbia river. 2760. Sumatra, west coast :—Acheen head to Tyinkokh bay. 219. Sumatra, west coast :—Acheen head to Diamond point. 2134. Borneo, west coast :—Bruni river entrance. 623. Africa, west coast :—Fernando Po island. 78. Spain, north coast :—Port Cedeira, Port Vivero, Port Rivadeo. 1848. Spain, south coast :—Port of Malaga. 1055. Australia, west coast :—Bedout island to cape Cuvier. 1951. England, west coast :—Liverpool bay. 1170b. England, west coast :—Holyhead to Liverpool, eastern sheet. 2182a. North sea :—Southern sheet. 2576. Eastern archipelago :—Sulu archipelago and north-east coast of Borneo. 2810. Ireland, east coast :—Lough Carlingford entrance. 853. North America, east coast :—St. Andrew sound to St. John river. 1807. Australia, north coast :—Carpentaria gulf, southern side. 1630. England, east coast :—Orfordness to Cromer. 518. Australia, west coast :—Shark bay. 1056. Australia, west coast :—Cape Cuvier to Champion bay. 2339. North sea. 243. Mediterranean sea :—Port of Alexandria. 893. Newfoundland :—Burin harbour to Devil bay. 2662. Eastern archipelago :—Ports in Macassar strait. 1043. Australia, north coast :—Gulf of Carpentaria. 1044. Australia, north coast :—Gulf of Carpentaria to cape Ford. 648. Africa, east coast :—Delagoa bay to Masangzani bay. 1607. England, Thames river :—North Foreland to the Nore. 2124. New Guinea, south coast :—Bramble haven to Rossel island. 1777. Ireland, south coast :—Queenstown harbour. 2094. England, west coast :—Isle of Man. 1752. Australia, south coast :—Approaches to port Adelaide. 2728. Spain, west coast :—Bayonne to Oporto. 632. Africa, west coast :—Walfisch bay to Orange river. 2522. South America, east coast :—Santa Catherina to Rio de la Plata. 77. Spain, north coast :—Gijon bay and Barquero entrance. 493. South America, east coast :—Piedras Negras point to Santa Lucia river. 516. North America, west coast :—Mangrove bluff to cape Corrientes. 2661a. China sea :—Northern portion. (*J. D. Potter, agent.*)

United States Charts.—No. 809. North America, East Coast. Coast of Labrador from Cape St. Charles to Sandwich Bay. From British Surveys to 1882. Price 1s. 8d.—No. 924. North America. North-East Coast. North and East Coasts of Newfoundland from Ste. Geneviève Bay to Orange Bay and the Strait of Belle Isle. Compiled from British and French Government Surveys. Price 1s. 8d.—Meteorological Charts of the North Atlantic Ocean for the months of January, February, October, November, and December. Price 2s. 1d. each.—Pilot Charts of the North Atlantic Ocean. No. 9 August, No. 10 September, No. 11 October, and No. 12 November, 1884.—U.S. Hydrographic Office, Bureau of Navigation, Navy Department, Washington D.C. Commander J. R. Bartlett, of U.S.N. Hydrographer. 1883-4.





PROCEEDINGS
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ROYAL GEOGRAPHICAL SOCIETY
AND MONTHLY RECORD OF GEOGRAPHY.

Four Years' Journeyings through Great Tibet, by one of the Trans-Himalayan Explorers of the Survey of India.

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(Read at the Evening Meeting, December 8th, 1884.)

Map, p. 136.

I PURPOSE this evening to give you an account of work done in Great Tibet by one of the Asiatics who are attached to the Indian Survey, to be employed in making explorations of regions beyond the British frontier, into which Europeans cannot penetrate with safety.

In the reports of the Survey this man is simply called A—k, in conformity with a long-standing custom of suppressing the names of the explorers while they are still strong and vigorous, and liable to be again employed in work of this nature. Thus the name of the celebrated explorer Pandit Nain Singh was not published until he was superannuated and living in retirement on the lands which the Government had granted to him as a reward for his valuable services.

Before describing the work of Pandit A—k, I must state the reasons which led to the selection of his lines of exploration. During the years 1865–72 Asiatic explorers, deputed by the late Colonel Montgomerie, had crossed the great Himalayan ranges at various points, and explored Southern Tibet from the highlands which give birth to the upper sources of the Indus, the Sutlej, and the Sanpo rivers, down the valley of the latter river eastwards to the meridian of Lhása. In 1874–5 Pandit Nain Singh, on returning to Léh with the mission which had accompanied Sir Douglas Forsyth to Yarkand and Kashgar, explored the direct route from Léh through Western Tibet to the great Tengri or Namcho Lake, and then to Lhása, whence he struck down to the Sanpo river which he crossed at Chetang, the lowest point then reached by any explorer; finally he entered Assam, via the Tawang valley of Bhutan, thus completing what Mr. Clements Markham has rightly called a really magnificent exploring achievement.

But there still remained vast regions for exploration, more particularly to the north and east. Of the country between Eastern Turkistan

and the frontiers of China which had been traversed by the enterprising Venetian traveller Marco Polo in the 13th century, scarcely anything more was known than the very little which he says of it in his journals. Of the extensive region between the routes travelled by Marco Polo and Nain Singh absolutely nothing was known. Eastern Tibet had been crossed in two directions by the adventurous French missionaries, Messrs. Huc and Gabet, on their journeys from China by way of the Koko-nur district to Lhása, and back by way of Chiamdo to the province of Sze-chuen, but without adding to our knowledge of its geography. And Colonel Prejevalsky, the celebrated Russian explorer, had at that time only succeeded in penetrating a short distance into the north-east corner of Tibet.

Thus, in the spring of 1878, I despatched Pandit A—k towards this region, directing him to strike across the great plateau of Tibet into Mongolia by any route from south to north which he might find practicable, and to return by a parallel route over new ground. As he might very possibly strike one of the great routes to China, and be tempted to find his way to the coast, and return to India by the sea route to Calcutta, I particularly directed him to avoid China, of which the geography was well known, and make his way as far as practicable through Tibet, which was comparatively a *terra incognita*.

He was provided with a nine-inch sextant for taking latitude observations, a Tibetan tea-bowl for a mercury trough, a prismatic compass for taking bearings to distant hill peaks, a pocket compass for common use in taking his route bearings, a rosary for counting his paces, a Buddhist prayer barrel for secreting his field books, an aneroid barometer, and some boiling-point thermometers. He was also supplied with ample funds to purchase merchandise at Lhása, where he was to commence his explorations in the guise of a travelling merchant.

Warned by the difficulties which Nain Singh and other explorers had met with in getting past the guards established by the Nepalese Government on all the principal passes leading over the Himalayas into Tibet, he determined to avoid Nepal altogether, and proceeded via Darjiling, through the westernmost valley of Bhutan. Accompanied by two men, one a companion, the other a servant, he left Darjiling in April 1878, and travelling via Chumbi and Phari Jong, struck into the route which had been traversed by Bogle in 1774, Turner in 1783, and Manning in 1811, but not subsequently by any European. He crossed the Himalayas by a low and easy pass into Tibet, and proceeded via Giangche and the lake encircling a great island which figures so prominently on all maps of these regions, to Khambabarji, on the right bank of the Sanpo river, which he crossed by a bridge formed of chains of iron supporting narrow planks, just broad enough for one man to go over at a time. He then proceeded to Lhása, where he arrived in September.

Here he laid in a stock of merchandise, and made inquiries for the next caravan starting for Mongolia, as it would only be possible for him to perform the journey under its escort. The leader of the caravan would give him no more definite answer than that it might leave in February. When pressed to fix the date he declined, saying that long experience had taught him that when the date is fixed, the robbers by whom the road is infested find it out from their spies at Lhása, and then the caravan never arrives safely at its destination. Afterwards, he declined to go at all, and the Pandit had to remain at Lhása until the following autumn, when a caravan arrived from Mongolia, half of which was to return immediately; he arranged to accompany it with his party and several Tibetans who had long been waiting for a favourable opportunity to make the journey.

He was thus detained a whole year at Lhása, but he was far from idle while there; he made a survey of the celebrated city, the Rome of Tibet, which is crowded with temples and religious edifices, and has its Vatican in the monastery at Potola, where the Dalai Lama resides, who is regarded not merely as the high priest of Buddhism, but as a visible deity, the incarnation of Buddha. This building stands on a commanding eminence, and is surmounted by five gilded cupolas, which, when sparkling in the sunlight, present a dazzling and gorgeous spectacle, visible for miles round; it contains numerous images, one of which, in honour of the god Jamba, is of prodigious dimensions; it is seated on a platform on the ground floor, and its body, passing through two floors, terminates in a monstrous head jewelled and capped; the figure is about 70 feet high, and is made of clay, but is well gilded; the pilgrims to this image have to make three series of circumambulations around it, one round the legs, the next round the chest, the third round the head, for circumambulation is an essential feature in the religion of the Tibetans; the object of devotion, whether an image or a temple, or a holy hill, or a great mountain rising high into the heavens and sacred to the gods who are supposed to hallow it by their presence, has to be gone round a specific number of times, in order to secure a minimum of blessing to the worshipper; and the oftener this number is exceeded the greater the expected reward.

The Pandit's detention in Lhása enabled him to witness the festivals held at the commencement of the new year, which occurs about the middle of February. At this time all the gods and goddesses are supposed to be present, and a large gathering of Tibetans takes place to pay homage to them, and unite in prayers for the welfare of the country. During a whole month the government of the city is removed out of the hands of the ordinary rulers and entrusted to a Lama of the Daibung monastery, who while in power is styled the Jalno, and whose business it is to make close inquisition into the manner of life of the citizens, and punish them for their misdoings; this he does by fines

levied often very arbitrarily, and with much severity, as he is allowed to appropriate for himself all the money thus accumulating. The Pandit says, that such of the richer classes as may in any way have incurred his displeasure now leave the city and reside in the suburbs; while the poorer classes who are always dirty and never change their clothes, now sweep and whitewash their houses through fear of being punished for their uncleanness. At the end of a month a ceremony of vicarious sacrifice is performed in propitiation of the deities; the victim is a man specially summoned by the Jalno; they play dice together; if the man wins great evil is foreboded; if the Jalno wins there is much rejoicing, for it is then believed that the victim has been accepted by the gods to bear the sins of all the inhabitants of Lhása; thereupon his face is painted half black and half white, a leather coat is put on him, and he is marched out of the city, followed by the whole populace hooting and shouting; he is not however driven into the wilderness, as was the scape-goat of the Israelites, but is conducted to a distant monastery, where, if he does the right thing, he dies within the next twelve months, for that is considered an auspicious sign; if he survives, the gentle and compassionate Tibetans seem to bear no malice against him for having disappointed their expectations, but they allow him to return at the end of the year and again act the part of scape-goat for his countrymen's sins.

On the completion of the festivals and ceremonials which usher in the new year and last for about a month, the citizens are considered to have become purified both as regards their souls, their bodies, and their houses; the work for which the Jalno was entrusted with special temporary powers is finished; he returns to the obscurity of his monastery, and the government of the city reverts into the hands of the Rajah and four ministers, who direct the administration of the country under the Dalai Lama, their spiritual head.

While residing in Lhása, the Pandit availed himself of the opportunity afforded him of studying the Mongolian language, and the sacred books of the Tibetans; what he now learnt stood him in good stead afterwards, for he was not only able to communicate freely with Mongolians and Tibetans without the intervention of an interpreter, but when his funds failed him, and he had not the wherewithal to defray the expenses of his return journey, he even succeeded in raising money by going about from village to village, reciting passages from the sacred books.

At length, on the 17th of September, 1879, his unavoidably prolonged residence at Lhása came to an end, and he started northwards, in the company of a caravan comprising about 100 individuals. The majority of these were Mongolians, a few of whom were accompanied by their wives; the remainder were Tibetans. The Mongolians were all mounted without exception, for no Mongolian will walk if he can by possibility

ride, and even the shepherds ride round their flocks. The Tibetans mostly walked. All were armed with spear, matchlock, or sword, to protect themselves from the bands of robbers by whom they were so liable to be attacked, that the ever present thought was how to escape being plundered: on the line of march the caravan was invariably preceded by horsemen to give warning of approaching danger; close order was kept, and stragglers were waited for; the marches were always made by day, and usually commenced at sunrise; and at night a guard of two Tibetans and two Mongolians was set to protect the sleepers.

The route taken was that from Lhása to Chaidam. For some miles it passed through a country of low hills and wide valleys, with several temples and monasteries, occasional villages, and here and there a little cultivation; the general level of the country rose from about 12,000 feet at Lhása to 13,500, at the point where villages and cultivation ceased. Sixty miles from Lhása the Lani La pass, 15,750 feet, was crossed, when the travellers found themselves on the highly elevated plateau which occupies the greater portion of Tibet, and is called the Jang-, or Chang-tang, which literally means the northern plain. I purpose giving some description of this very remarkable feature of the earth's surface presently; here I need only say that on entering it the Pandit found that he had passed from a cultivated into a pastoral region, and from fixed habitations to wandering encampments. He came across the grazing grounds of the Government brood mares, 300 in number, from whose milk a fermented liquor is prepared for the Dalai Lama, which constitutes the only spirituous beverage this august individual may lawfully drink.

A week's march carried the Pandit over ninety miles of the Chang-tang to the notable monastery of Shiabden, which, though situated at an altitude of 15,000 feet above the sea-level, is surrounded by houses, and has a permanent population of about 500 persons, of whom four-fifths are laymen, and the remainder lamas. Here caravans may rest in safety, and if need be, purchase provisions, but at very high prices. Up to this place and for about as far again onwards, the route lay through numerous encampments of Tibetan nomads, who dwell in tents covered with the black hair of the yak, which are similar in shape and construction to the felt-covered tents of the Kirghiz nomads at the Health Exhibition in South Kensington. The Pandit estimates the number of tents which he passed in this region as about 7000. But for the remaining 240 miles the Chang-tang was entirely uninhabited; no more encampments were seen, nor monasteries, but only occasional Buddhist manis, or way-side shrines; a party of five mounted men, supposed to be robbers, was met with, and a single caravan proceeding from Mongolia to Lhása; but nothing else. The Pandit describes this region as abandoned to wild animals, and not resorted to by either Tibetan or Mongolian nomads. The heights of his camping grounds on

the Chang-tang ranged from 13,500 to 15,000 feet; the highest pass crossed was 16,400 feet, on the Dángla range, which constitutes the water-parting between the upper basins of the Yang-tsze-kiang, one of the great rivers of China, and the Mekong river of Cambodia. The route crossed the upper sources of the latter river—here called the Chiamdo Chu—as small streams taking their rise in adjacent hills to the west; it also crossed three of the principal affluents of the former river, the Maurus, the Ulángmiris, and the Ma-chu, each in itself a considerable river, and only fordable where split up into several channels; their sources lie in the lacustrine region to the west, probably far away; but at a short distance to the east they join together and form the river which Tibetans call the Dichu, and Chinese call the Kin-sha-kiang, and which eventually becomes Gill's River of Golden Sand, the Yang-tsze-kiang.

After a march of five weeks at this great elevation, the travellers reached a range called the Angirtákshia by the people of the country; it is the northern boundary of the Chang-tang, and is believed to be a continuation of the well-known Kuen-lun range of Western Tibet. Crossing it by a pass of precisely the same height as the Lani La, by which they entered the Chang-tang, they descended into the plains of Chaidam, and in a few days found themselves down at a level of 9000 feet in a comparatively warm region, with plentiful forests and cultivation. Arrived at Thingkáli, they thought they had nothing more to fear from the robbers of whom they had been in constant dread hitherto; all the members of the caravan assembled together to exchange hearty congratulations on the good fortune which had so far attended them, and which they attributed to their own cunning and sagacity in evading the robbers; then they bade each other farewell, with mutual kindly offers of future friendliness and hospitality; the Mongolians, who formed the greater portion of the party, dispersed themselves in different directions, but the Tibetans remained with the Pandit to accompany him further north. He seems to have found the Mongolians very kind and friendly, ready to help him whenever his supply of provisions ran short, remarkably honest and truthful, exceedingly partial to intoxicating liquors, but generally as harmless when drunk as when sober; even if so much the worse for liquor that his legs are no longer reliable, the Mongolian can still sit his horse with safety, being accustomed to ride from the time he was a baby.

After a few days' rest at Thingkáli, the Pandit and his Tibetan friends were about to start for Hoiduthára, when they were attacked by a band of some 200 mounted robbers from Chiámogolok, who had come to plunder the Thingkális, and fell on them also. The robbers were eventually driven off, but they managed to carry away most of the goods which the Pandit had brought to trade with, and all his baggage animals, but happily none of his instruments. Though much crippled

by his losses, he determined to press on and make his way to Lob Núr and the plains of Gobi. He crossed the Chaidam plateau, and reached Hoiduthára towards the end of December 1879, with his companion and servant. As the proceeds of the sale of the merchandise which the robbers had left behind were insufficient to carry them on, they took service with a Tibetan from Giangze, who had migrated some years previously to this country, where he had become a man of property and influence; he befriended them, and recommended them to remain at Hoiduthára until the winter was past, offering them food and lodging meanwhile, in return for which they were to look after his camels. Towards the end of March they resumed their travels northwards, and in a fortnight reached Yembi in Saithang, the head-quarters of a considerable population of Mongolian nomads, who dwell in tents covered with white felt like the Kirghiz tents at the Healtheries Exhibition. Here, at an elevation of 9000 feet, the Pandit halted for three months, and disposed of his remaining merchandise by sale and barter, realising 200 rupees in silver, and some mares and colts. He was waiting for an opportunity to proceed to Lob Núr with a party of traders when, during a temporary absence from Yembi, his servant basely deserted him, taking away most of his money and newly acquired horses; the man disliked the idea of travelling into a country of which he had heard that the inhabitants were Mahomedans, who were at war with the Emperor of China, and he had frequently endeavoured to dissuade both the Pandit and his companion from going further, but finding them bent on proceeding, he availed himself of the earliest opportunity to rob and desert them. They were now left practically destitute, but they still determined to persevere. They again went into service and tended ponies and goats for five months, at the end of which they decided to move on with the limited funds at their disposal, and should these fail, to beg their way. Their master, the Pandit says, was a thorough gentleman, and on their departure he gave them a horse worth 40 rupees, some warm clothing, and provisions for their journey. They started from Yembi on the 3rd January, 1881, with a party of traders, crossed the Altyn Tag range by a pass 14,000 feet high, and then descended into the plains of the Chinese province of Khánsu to a level somewhat below 4000 feet, materially lower than anything they had met with since leaving Darjiling. On the sixth day they reached the important town which the Chinese call Tung-Hwan-Hsien, but which Tibetans call Saitu, and Mongolians Sachu; but the latter names appear more properly to apply to the adjacent ruins of a former city, which was visited by Marco Polo, who calls it the city of Sachiu, and describes the inhabitants as mostly idolaters, but some Nestorian Christians and some Saracens.

After a few days' residence at Sachu, the Pandit made arrangements for proceeding to Lob Núr with a party of traders, and had actually

started with them and proceeded for a short distance from the town, when he was overtaken by a horseman who was sent by the Governor to compel him and his companion to return. The Governor took them for spies and kept them under surveillance for seven months. At the end of that time an influential Lama whom they had known in Saithang arrived and recognised them, and obtained their release. He had come to visit a neighbouring temple of great renown called the Sange Kuthong or thousand images, and was about to return to his home at Thuden Gomba, 600 miles to the south, on the road to Darchendo. He offered to take the Pandit and his companion with him as servants, and they gladly accepted the offer, as they were most anxious to get away from Sachu, where for the first time in their long journeyings they were looked upon as suspicious characters; they therefore did not venture to take any observations for the latitude and boiling-point here, but kept their instruments concealed.

They left Sachu with their new master in August 1881, returning over their former line of route through Saithang to Hoiduthára; there they struck into a new line which took them southwards over the plain of Upper Chaidam to Jún, which had been visited by Prejevalsky in 1872; thence they proceeded to the Angirtákshia or Kuen-lun range, which they crossed at the Namohan Pass, about 180 miles to the east of their previous point of crossing. They now found themselves again on the Chang-tang plateau, but in a quarter where it is very much narrower than on their first route line, only 140 miles broad instead of over 400; they crossed another Ma Chu or Red River, one of the principal sources of the great Hoang-ho or Yellow River of China, and a range of hills called the Lámathologa from its rounded peaks like the heads of Lamas. Fear of the neighbouring tribe of Chiámogoloks, which is noted for its robbers, caused them to travel as quickly as they could; thus eight days' march carried them across the plateau and down to Niamcho, where they found some houses and a little cultivation. Five days onwards brought them to the home of their Lama master in Thuden Gomba.

While halting for a few days in the Jún district, they received tidings of the servant who had robbed and deserted them, that he had purchased goats, sheep, and mares, and was residing with some Tibetan nomads in the neighbourhood; they sent a man to persuade him to rejoin them, but he declined, and advised them to give up their work and join him instead as the wiser thing to do. The Pandit's narrative is very remarkable for the absence of any expression of animosity or resentment towards this man. But I think it may be said with truth of Asiatics generally that they are not surprised when a man makes the most of his opportunities to better himself, even at their own expense; men with whom we Englishmen are ever ready to sympathise as victims of oppression, whether in Egypt, or Turkey, or India, take a much more

charitable view of their oppressors—more particularly when they happen to be their own countrymen—than we do, feeling probably that they have only been done by as they themselves would have done had they had the chance; though very angry at the moment, their anger is not unfrequently succeeded by admiration of the skill which their oppressor has shown in doing well unto himself.

Thuden Gomba, where we left the Pandit, is a monastery of no great size or importance, situated in the valley of the Di-chu, the principal source of the Yang-tsze-kiang. Here he and his companion had to wait two months until it pleased the Lama, their late master, to pay them their wages, and give them a promised letter to an influential friend in the neighbouring town of Kegudo to help them to get back to Lhása. This friend recommended them to a merchant who was about to proceed to Darchendo, and with him they took service for the journey so far.

Kegudo is a town of some importance at the junction of the most frequented trade routes from Lhása to Sining and Darchendo: the elevation is nearly 12,000 feet. Leaving this place on the 12th of January, 1882, the Pandit and his companion proceeded for some distance through the valley of the Di-chu, then traversed the highlands between that valley and the valley of the Ja-chu, crossed the latter river at an elevation of 10,500 feet, and halted at the famous monastery of Kanzego, which is inhabited by 2000 Lamas and surrounded by a town of 2500 houses, and is so old and sacred that the people of the surrounding districts swear by its name in confirmation of their declarations; then leaving the Ja-chu to the west they bore straight for Darchendo, which place they reached on the 5th of February, having travelled a distance of about 420 miles in 25 days. This portion of their journey lay through a fairly open and easy country, and along a well-established trade route, passing through numerous villages and in the neighbourhood of many monasteries; just at the end, however, a difficult pass, the Gi La, 14,700 feet high, over a snowy range, had to be crossed before reaching Darchendo. The Pandit met numerous Tibetan traders returning to their homes with tea purchased in China, the aggregate amount of which he estimates at 300,000 lbs.; all of it appears to have been of the common coarse kind which the Chinese think quite good enough for Tibetans; thus it was not the Pandit's good fortune to come across either of the two kinds of tea so happily discovered by our gold medallist Mr. Colborne Baber, one of which is naturally provided with sugar, and the other with a flavour of milk.

Darchendo is the Tibetan name of the town which the Chinese call Ta-chien-lu; it has been well described by Captain Gill in his interesting work 'The River of Golden Sand.' It is situated on the border line between China Proper and Tibet, the country to the east being governed directly by the Chinese, and that to the west by native chiefs, subject to China, but also greatly under the influence of the Grand Lamas of

Tibet, whose control though here nominally spiritual, embraces much of the temporal also. At Darchendo the Vicar Apostolic of the Franco-Catholic Mission in Tibet resides, and as I had given the Pandit a general letter of introduction to the French missionaries, he presented it to Bishop Biet, the successor to Monseigneur Chauveau, by whom Captain Gill had been so warmly welcomed. The Bishop kindly assisted the Pandit with a present of money, and advised him to take the direct route back to India via Bátang; he also wrote to the Abbé Desgodins, a well-known member of the mission who was then in India, requesting him to inform me that the Pandit had reached Darchendo in safety and good health, and was about to return to India. This information was most welcome, as four years had elapsed since any communication had been received from him, and most distressing rumours had recently reached his family, that he had been seized by the authorities at Lhása and had had his legs chopped off in order to put it out of his power to make further explorations; I was making inquiries of the truth of these rumours through the agents of the Nepal and the Kashmir Governments at Lhása, when I had the satisfaction of receiving the Bishop's letter, which showed that the rumours were a pure fabrication; in fact from first to last, though occasionally arrested and detained as a suspicious character, he never met with any personal ill-treatment.

Turning westwards from Darchendo he took the route to Bátang which Gill had traversed in the summer of 1877. A week's march brought him to the Yalung river, also here called the Nagchu, which he believes to be a continuation of the Jachu which he had previously crossed in the district of Yalung, and the very fact of its being called the Yalung river makes this very probable. To cross the river the sanction of the headman of the village of Nag-chu-kha, on its eastern bank, was necessary; but the Pandit arrived there in the month of February, when the New Year's festivals were being celebrated; thus, on asking for permission to cross, he was suspected to be a thief, and told that no one but thieves cared to travel at this time of the year. He was detained some days while inquiries were made as to whether any theft had recently been committed at Darchendo, and the answer being satisfactory he was set at liberty. Crossing the river, at the elevation of 8400 feet, he proceeded to Litang, which Gill describes as a cheerless place, one of the highest cities in the world; its altitude is 13,300 feet or about the same as that of Potosi, but 1700 feet below the Shiabden monastery at which the Pandit had halted when crossing the Chang-tang. Small-pox was prevalent in the Litang district, for protection against which the Pandit found that a kind of snuff, prepared from the dried pustules of small-pox patients, was being administered by the Chinese physicians as a prophylactic; it has the same effect as inoculation, inducing a mild form of the disease, and thus protecting the snuff-taker from the

severer form which exists during an epidemic. Tibetans have a great horror of this disease, which is almost invariably fatal to them, though their neighbours, the Chinese, think no more of it, Captain Gill says, than an Englishman does of a cold.

Bátang was reached in the middle of March, and then the Pandit struck across the remarkable region of contiguous parallel rivers which forms such a prominent feature on all maps of Tibet, but which as yet has not been explored by any European, though several have attempted to penetrate it both from the east and from the west. First descending into the valley of the Di-chu or Kin-sha-kiang, he crossed the river at an altitude of 7700 feet, and then ascended the western highlands to the important town of Gárhok, altitude 12,000 feet. Again descending, he entered the valley of the Chiamdo Chu, or Lan Ts'ang Kiang, the Mekong river of Cambodia, which he crossed at 9500 feet, and then ascended to the plateau of Dayul, 11,000 feet. His next descent brought him to the valley of the Giama Nu Chu, or Lutze Kiang; he crossed the river at an altitude of 7200 feet, and again ascending reached the Tila-la, a pass 16,000 feet high on a range of mountains which is one of the world's great water-partings, as we now discover from his survey. Descending westwards from that pass he entered the Zayul valley, the river of which flows by the Brahma Kund, or pool of Brahma, into Upper Assam, where it is known as the Lohit Brahmaputra. He descended this valley to the village of Sáma on the boundary between the Tibetan district of Zayul and the independent semi-savage tribe of Mishmis. Here he was within 30 miles of the British frontier; but narrow as was the belt of intervening country he dared not attempt to cross it, as he was told he would certainly be murdered by the Mishmis if he trusted himself to them. He learnt that some years previously they had allowed two French missionaries, Messrs. Krick and Boury, who were endeavouring to make their way to Tibet from Upper Assam, to pass through their country, and had then pursued and murdered them near the very village of Sáma at which he had arrived. Very reluctantly, therefore, he had to abandon his intention of returning directly to India, and to prepare for the long and circuitous route *viâ* Lhása instead.

It was now the middle of May, 1882. The principal pass over the Himalayas which he had to cross on his journey northwards would not be practicable for some weeks, so he went about from village to village reciting the sacred books of the Tibetans, and thus managed to earn some 20 rupees to meet the expenses of the long journey before him. At one of these villages, Rima, which is obviously identical with the Roema of previous maps, the Pandit and his companion were placed in quarantine for twenty-two days because they had come from places where small-pox was raging. The altitude of Rima was found to be about 4600 feet, the lowest of any of the Pandit's determinations in Tibet. The Zayul

valley is regarded by the Tibetans as the hottest and most disagreeable region in their country, and, therefore, criminals sentenced to transportation for life are sent there by the Government of Lhása to undergo punishment.

On the 9th of July the Pandit started northwards up the valley of the Rong Thod river towards the great range of the Southern Himalayas, which he crossed at the Ata Gáng Lá, about 15,000 feet high; he then came once more on to the elevated plateau of Tibet, and in a quarter which is of great interest to geographers, for it is the region of the water-parting between the eastern and western systems of rivers, and it constitutes an impassable barrier to the oft-asserted flow of the great Sanpo river of Western Tibet into the Irawadi. For some 40 miles of his route the water-parting between the Gíama Nu Chu and the eastern basins of the Sanpo lay on his right hand at a short distance; he then crossed it and entered the western basins of the affluents of the Gíama Nu Chu, and from thence onwards for 200 miles it lay on his left hand, when he again crossed it. Thus there can no longer be any doubt that the Sanpo river merges into the Brahmaputra, as has been constantly urged by Colonel Yule and many of our ablest geographers.

The Pandit's route lay generally over a high plateau, the measured altitudes ranging from 11,000 to 13,500 feet above the sea; he passed numerous villages and monasteries; at Lhojong he struck what is called the Junglam, or official road between Bátang and Lhása via Chiamdo, and following it, passed through several places mentioned by Huc in the account of his return journey from Lhása to China. Coming from Zayul, the penal settlement of the Tibetans, their travel-stained and woe-begone appearance led to the detention of the Pandit and his companion at the Shinden monastery, under the suspicion of being escaped convicts, for some days, when an influential personage, whose acquaintance they had made at Rima, arrived, and caused them to be liberated. Happily for them it was now summer, and they did not need much warm clothing; they crossed with apparent ease a pass of 18,000 feet, and another of 17,300, over hill ranges which Huc describes as vast mountains cut up with cataracts, deep gulfs, and narrow defiles, entangled pell-mell, of forms *bizarre* and monstrous, abounding in horrible and dangerous precipices even in parts which the people of the country describe as flat as the palm of the hand. Huc had to ride always, for he was no mountaineer, and was told that he would be far safer on the back of a Tibetan horse than on his own legs; he made many a descent on horseback, piously committing his soul to heaven at starting, as he scarcely expected to reach the bottom alive; it is but fair to him, however, to say that he was travelling in the months of March and April, before the winter's snows had melted, and when the roads were still slippery with ice.

Crossing the last of these ranges—the name of which according to

Huc is Loum-ma Ri, meaning the mountain of the goddesses—the Pandit descended to Chomoráwa at the head of the Kichu valley, the river of which passes by Lhása. Here he found the nomads engaged in burying animals that had died from a disease caused by an insect which appears to be a species of wingless beetle. It is half an inch long, with a black head and dull yellowish body, and is common all over Tibet. These insects appear to poison their surroundings by their mere presence; they swarm under grass, which for some distance around becomes so dangerous that animals grazing on it are at once attacked by a fever which afterwards becomes contagious, and attacks other animals, and even the herdsmen, and persons eating the flesh of an infected animal. Very few who are attacked by this fever, whether man or beast, are said to recover. The only treatment practised by the natives is precautionary; the Pandit says, "they eat beforehand scorched insects, which fortifies their system against the poisonous effects of living ones." This is a practical application of the maxim, *Similibus similia curantur*, which would have rejoiced the heart of its illustrious author. The insects are not easily discovered, as they always remain hidden under the grass; but in the winter they are readily detected by the rapid melting of the snow over the spots where they are congregated; a fire is then lighted over them, and they are removed when thoroughly scorched, to be administered with salt to man and beast as a prophylactic; one of these baked insects is considered sufficient for a man.*

At this place the Pandit left the road to Lhása, and turned southwards to the Sanpo river, which we may now without any hesitation call the Brahmaputra; he crossed it at Chetang, height 11,500 feet; he then proceeded up the right bank to his original starting-point Kham-babarji. This done, his work was accomplished, and he returned as rapidly as he could, reaching Darjiling with his companion on the 12th of November, 1882, just four and a half years after they had started on their arduous expedition. They arrived in a condition bordering on destitution, their funds exhausted, their clothes in rags, and their bodies

* I am indebted to our Librarian, Mr. E. C. Rye, for the following interesting note. In Westwood's 'Introduction to the Modern Classification of Insects,' vol. ii. p. 228, will be found a discussion of the application of the name *Buprestis*, which now represents large, brilliant, and hard beetles living in or upon timber trees for the most part, but was by the ancients apparently given under various inflections (such as *Vulpestris*, *Bulpestris*, *Bustrepis*, *Bubestea*, &c.) to a poisonous insect, said to cause oxen to swell, inflame, and burst (*Βούπρηστις, παρὰ τὸ πρήσαι τὰς βοῦς, quis boves rumpit*). Belon has recorded that there was on Mount Athos a winged insect like the *Cantharis* or Blister-beetle, which feeds upon various low plants and was called "Voupristi" by the Caloyers or monks, who asserted that when horses or other cattle even feed upon the herbs which the insects have touched, they die from inflammation, and that it is an immediate poison to oxen. Latreille supposes that this Athos insect is a *Mylabris*, a view in which Kirby and Spence agree; and, as the *Mylabridæ* (which are closely allied to the *Cantharidæ*) are known to have strong vesicant properties, and are apparently especially numerous both in species and individuals in Central Asia, there seems every probability that the injuries to cattle by insects reported by A—k may really be owing to beetles of this family.

emaciated with the hardships and deprivations they had undergone. They were in a worse plight than the Russian Prejevalsky was on returning to China from his first expedition to Tibet, when he and his companions were called "the very image of Mongols," an epithet which he seems to have considered most opprobrious. But, though worn and weary, they were triumphant for they had succeeded in bringing back the whole of the instruments they took away with them, even the bulky 9-inch sextant, which, however, was not packed in a box, but wrapped round with felt and wadding; they had also preserved—what was of very much greater importance—all their journals and field-books. After a short stay at Darjiling to replenish their wardrobes and make themselves look respectable, they went down to Calcutta to report themselves to me and give me an account of their travels; as may be supposed, I was heartily glad to see them returned safe and sound, and to learn what a considerable extent of new ground had been surveyed.

The Pandit succeeded in keeping up through the entire length of his journeyings—about 2800 miles—a continuous and unbroken route survey, with magnetic bearings and paced distances. The pacing was mostly his own, and in order to execute it, he never rode if he could avoid doing so, and was much looked down upon in consequence, more particularly by the Mongolians, the poorest of whom always ride. But in proceeding from Barong Chaidam to Thuden Gomba, a distance of 230 miles, the Lama with whom he had taken service insisted on his riding, in order the more readily to avoid robbers, by whom the road was infested; he then counted his horse's paces instead of his own; but he was careful to take latitude observations at certain points, to enable the average length of his horse's pace to be afterwards calculated from a comparison of the meridional dead reckoning with the difference of latitude, just as his own average pace is calculated for each section of his route. He took latitude observations at twenty-two places in all, and boiling-point determinations of height at seventy places. His field-books contain a fair amount of information as regards collateral details; they are tiny little volumes which he managed to secrete on his own person, and in a Buddhist prayer barrel which he always carried about in his hands. The primary object of this interesting little machine is to hold rolls of paper, superscribed all over with the four words "Om mani padmi hom," which constitute the Buddhist universal prayer; a single repetition of this mystical invocation is regarded as a pious ejaculation to Heaven, greatly beneficial to the utterer; while even the mechanical turning round of a roll of paper on which it is written is considered equivalent to the oral utterance, and likely to promote the spiritual and temporal welfare of the turner and his friends, and to bring good fortune to the neighbourhood generally. The oftener it is inscribed on the paper, the greater the blessing anticipated from the rotation of the barrel; thus, in some of the monasteries and temples there are prayer barrels

of enormous dimensions, on which it is written thousands of times, within and without; and even the hand-barrels have large receptacles, sufficient to contain several of the Pandit's field-books, as well as his pocket compass.

Of journals descriptive of the incidents of his travels, the countries he visited, and the manners and customs of their inhabitants, such as an educated European traveller would be expected to keep up, he had little or nothing. I must now explain why, not merely as bearing on his work, but in order to correct an erroneous impression which has got about, that the Asiatic explorers of the Indian Survey are educated native gentlemen; this is not the case; we have never secured the services of Asiatics who were well educated, and who also possessed the hardihood, and courage, and powers of endurance which are required of an explorer. Of course, our employés are bound to be men of intelligence, as well as of good physique; also to have had some education, but not necessarily much, just sufficient to enable them to acquire the rudimentary elements of surveying, to make the requisite observations and measurements, and to keep up their field-books. Thus our first great explorer Nain Singh was, when I enlisted him, the master of a village school in the Kumaon Hills, and his education and acquirements were much on a par with those of the village schoolmaster of whom Goldsmith sang in years long gone by, before School Boards were invented—

"The village all declared how much he knew;
'Twas certain he could write and cypher too."

Nain Singh also was regarded as a very learned man by his acquaintances, and given the honorary designation of Pandit, which is usually applied by natives of India to any learned Hindoo; it has thus come to be applied not only to him, but to others of the Hindoo explorers of the Survey, though, of course, not to any of the Mahomedans.

He soon learnt how to make route surveys, and determine heights and astronomical latitudes. And so did our present Pandit. But neither of them could have acquired the difficult art of determining absolute longitudes which however even accomplished European travellers do not invariably succeed in mastering. The work most strongly impressed on the Asiatic explorers is to keep up an unbroken record of the bearings and distances on their routes from place to place, for when this is done, and a few latitudes are also determined, sufficient data are available for the construction of a fairly accurate map of the survey. The distances they obtain by counting their own paces; this is a very tiresome thing to do without intermission for any length of time, though it is told of the celebrated Dr. Chalmers of Edinburgh that he had acquired a knack of counting his paces and carrying on a conversation simultaneously, so that at any time he could tell his companion the precise distance they had walked. Our explorers always wear a

rosary—what we may be sure the worthy Scotch minister never wore—to help them in counting their paces, and they drop a bead at every hundred paces. Thus, the rosary and the prayer barrel are of much practical service as surveying instruments, and their constant use gives the explorers an air of propriety and respectability in the eyes of the mechanically devout Tibetans, and never excites suspicion.

The field survey work is regarded as by far the most important business of the explorer; he is purposely not taught to reduce his own observations, or to plot the maps of his routes, for the only check on his work lies in the having this done by an independent agency, on his return to the head-quarters office.

It will be now readily understood that the explorers, though intelligent and skilful observers, are not capable of writing an account of their travels, at least, in a form that would be suitable for publication, though sitting by your side, they will give you a most interesting narrative of their adventures and journeys, and the people and places they have visited. Thus, on their return they have to be taken in hand and questioned and listened to, and their narrative has to be translated into English and written down; simultaneously their latitudes and height determinations are worked out, and their field-books are plotted in sections. Finally, a summary and general discussion of the results of the exploration is made by the head of the office to which they are attached. It was in doing this for Nain Singh's explorations that first Colonel Montgomerie, and afterwards Major Trotter, were so successful in producing interesting narratives that the enterprising village school-master came to be regarded as an educated traveller; his designation of Pandit may also have been misleading to those who were not aware that it was simply an equivalent to the Scotch "Dominie."

Our present Pandit was mainly educated by Nain Singh, and is much the same stamp of man, happily, for had he gone through a regular course of study at one of the Indian universities and been more delicately nurtured, he would scarcely have cared to become a servant to a succession of foreign masters, and to tend camels and horses and goats, in order to acquire the means of carrying on his surveys.

On rejoining the head-quarters office at Dehra Dun, and making over his field-books and instruments, he was given some months' leave of absence to his home. When he returned to the office, his overflowing information was written down, and the map and account of his journeys were prepared under the superintendence of Mr. Hennessey, who has done for him what Colonel Montgomerie and Major Trotter did for Nain Singh. And now the maps have been published, and the account of the explorations, with Mr. Hennessey's Summary and Discussion, will shortly be published too, the Government of India having sanctioned this being done, but so recently that as yet only preliminary proofs sent to myself have reached England.

It so happened that soon after I despatched our Pandit on his explorations, two expeditions into Tibet were organised, one from the north under the Russian Colonel Prejevalsky, the other from the east under the Hungarian Count Bela Szechenyi. In 1879-80 Prejevalsky explored a route across Mongolia, viâ Barkul and Chami to Sachu, the northernmost point reached by our Pandit, whence he struck southwards through Chaidam and over the Kuen-lun range to a point nearly on the parallel of 32°, and about 170 miles north of Lhása, along a route which in the main is identical with the route which the Pandit took in his journey in the opposite direction; at this point Prejevalsky was stopped, and turned back again. In 1879 Count Szechenyi and his companions, coming from Western China, traversed the entire length of the province of Kansu as far as Sachu, whence they hoped to penetrate into Tibet, but were not permitted to do so; returning eastwards, they endeavoured to take the road from Koko Núr to Lhása, but were again baffled, though supported by the Chinese officials; they were told that they could only enter Tibet viâ Bâtang. They proceeded, therefore, to Darchendo, and travelled from thence to Bâtang over the identical route which had been taken two years previously by Captain Gill, and was taken three years afterwards by our Pandit. At Bâtang, like Gill, they found unconquerable opposition to any further advance towards Lhása, and, as he had done, they turned southwards and proceeded, viâ Ta-li-fu and Bhámo to India. Thus, the Pandit's nationality and knowledge of the Tibetan language enabled him to explore regions which Englishmen, Russians, and Hungarians alike had found barred against them. He had formidable competitors in the race to acquire a better knowledge of the geography of Tibet, but he has really accomplished more than any of his rivals, all of whom were much better educated and equipped than himself.

It is a singular circumstance that a country in which Englishmen were received with open arms a century ago, and which was twice traversed by the French missionaries, Messrs. Huc and Gabet, not forty years ago, now excludes Europeans of all nationalities even when supported by the Chinese Government. This is due to the influence of the Lâmas and other priestly classes by whom the country is governed, and also, it is said, much oppressed; they look upon a European as a certain precursor of conquest and subjugation. Nor is the idea a singular one. Early in the present century it was embodied in a treaty between the British and the Nepal Governments, prohibiting all Europeans, but a few privileged officials, from entering Nepal, and restricting even them to the district immediately surrounding Kathmandu. The Nepalese have ever been our faithful and friendly allies. They readily helped us in 1857, the year of the mutiny of the Bengal army, when we so greatly needed their help; still they have a strong and not altogether unreasonable objection to the admission of Europeans into their country.

Thus at the present day there are large areas in Nepal of which less is known than of the many regions in the heart of Africa which have been visited by the agents of the Royal Geographical Society; what is known has been mostly acquired by native explorers sent into the country first by Colonel Montgomerie and afterwards by Captain Harman, but it is not nearly as much as ought to be known of a region so close to the British frontier.

From this digression I return to the Pandit. The chief value of his work is geographical. His routes from Lhása to the point, some distance beyond Shiabden Gomba, where he commenced touching Prejevalsky, from Jún to Darchendo, and from Bátang to near Lhása, of which the aggregate length is about 1700 miles, are entirely new to scientific geography; for though the interesting and vivacious French missionary M. Huc travelled over a portion of the latter route, his account of it is valueless for geographical purposes, and in parts is so highly coloured and exaggerative as to have thrown doubts on its genuineness; but the Pandit's survey removes all doubts on this point, and enables Huc's narrative to be followed very readily, which has not hitherto been possible.

His having been unable to cross the country of the Mishmis and bring his labours to an end in British territory when he was at Sâma, so close to the frontier, though very distressing to him at the time, was most fortunate from a scientific point of view, in that it necessitated his surveying 600 miles of route over entirely new ground, which took him round the eastern basin of the Sanpo river and enabled him to determine that that river certainly flows into India, not Burma, and is the source of the Brahmaputra, not of the Irawadi; he was thus also able to ascertain the upper course of the Giamá Nu Chu or Lutse Kiang, called the Sok river by Huc, which lay on the other side of his route.

As regards the actual sources of the Irawadi, the information he has obtained is rather of a negative than of a positive character. His survey from the point where he crossed the Giamá Nu Chu to the Mishmi border is very minute and shows two high ranges trending east and west, which are certainly not crossed by any river flowing into Burma, such as the Kuts' Kiang of recent maps. There is, however, a bare possibility that his Giamá Nu Chu may be the upper source of the Irawadi, as has been conjectured by Herr Löczyn, the geologist attached to Count Szechenyi's expedition; on the other hand, it is affirmed to be the upper source of the Salwin river by the Abbé Desgodins who traversed it for some distance both above and below the ferry where it was crossed by the Pandit, down to the entrance of the valley on its left bank in which the French missionary settlement at Bongo is situated, where the Abbé resided for upwards of a year; thus it is scarcely possible that he can be mistaken. The only information obtained by the Pandit regarding its lower course was that it passes by Itiu Chiako, a noted place of pilgrimage in Burma, which is reconcilable with either hypothesis.

The Pandit's surveys are in very fair accordance with those of Gill and Prejevalsky, wherever the same ground has been gone over; thus, from Bátang to Darchendo, there is a close agreement with Gill even in minor details, and the accordance between the boiling-point determinations of height is quite remarkable. Comparing with Prejevalsky, the latitudes and heights agree very closely, and the longitudes very fairly—the Pandit's positions being sometimes to the east, sometimes to the west—over a distance of about 450 miles, between the parallels of 32° and 38° , up to Igi Chaidam; but beyond that point, they steadily diverge, until at Sachu the Pandit is about 25 miles to the west of Prejevalsky. It so happens that this place was also visited by Count Szechenyi and his party, and their longitude is as much to the east of Prejevalsky's as the Pandit's is to the west; the three latitudes agree.

All the Pandit's longitudes have been deduced from his route survey by dead reckoning controlled by astronomical latitudes. A second and very important check on them is obtained at his easternmost point Darchendo, where his value falls between two independent values differing by 14 miles, one determined by Count Szechenyi, the other by Mr. Baber and used by Captain Gill. Various other satisfactory tests are set forth in Mr. Hennessey's Summary, all tending to show that the Pandit has done his work right well, and is to be thoroughly relied on. I am happy to be able to state that the Government of India have already recognised the value of his services, and rewarded him by a suitable grant of land in perpetuity, as was done for Nain Singh. He has also been given one of the two bronze medals which were placed at my disposal by the Commissioners of the International Geographical Congress and Exhibition at Venice in 1881, for award to Asiatic explorers. I trust that our President and Council may deem his services worthy of some such token of the approval and favour of the Royal Geographical Society as was awarded, on more than one occasion, to his predecessor Nain Singh, whose successful career greatly influenced him in pressing forwards to complete his geographical explorations, regardless of the misfortunes which so often befell him, and which might well have daunted the heart of any man less earnest and persevering.*

* Pandit A—k has accomplished a much larger amount of exploration than has hitherto been performed by any of the Asiatic explorers of the Indian Survey; he is the man whom Mr. Clements Markham calls Pandit D in his 'Narrative of Mission of George Bogle to Tibet,' &c., p. cxvi. His principal route surveys are the following:—

(1) 1869. Milam to Rakas Tal Lake in Tibet, and thence along Karnali river to Kathai ghát, 400 miles.

(2) 1872. Shigatze to the Tengri-Núr Lake, and thence to Lhása (as Pandit D), 300 miles.

(3) 1873–4. From Tankse in Ladak to Kashgar and beyond, thence south-east to Polu, and south to Noh on the Pangong Lake, and back to Tankse, 1250 miles.

Thus he had surveyed 1950 miles of route line before commencing his present explorations which cover 2800 miles, exclusive of the distance travelled to reach Kham-batarji, the origin of the field work.

In conclusion, I would draw the attention of this meeting to that remarkable region, the Chang-tang of Tibet, which the Pandit crossed twice, on his way first from Lhása to Chaidam, and secondly from Chaidam to Darchendo. Notices of the western portion of this region have appeared in former communications to the Geographical Society, notably, in the admirable paper on the Physical Geography of Western Tibet by Captain Henry Strachey; but as yet the fact of its enormous extent, as well as great elevation, does not appear to have been fully recognised. Its outlines are represented on the wall-map exhibited, which is a reproduction of a skeleton prepared by Mr. Hennessey partly to serve as an index to the Pandit's map, and partly to show the limits of the Chang-tang; hills have been added, and for reasons which I will presently mention, it has been extended westwards to embrace the Pamir plateaus. A yellow band has been drawn round the entire region, the northern portion of which, coloured green, is believed to be uninhabited by man, while the southern portion is sparsely inhabited, and chiefly by tribes of wandering nomads. It is a vast expanse of softly undulating plains, diversified with lakes and rivers and hill ranges and, occasionally, great mountains. In this region the hills spring not from the sea-level or a little above, as in England and Europe generally, but from a level which is not much less on an average than 15,000 feet, or little below the highest mountain in Europe. Though highly elevated, it is not what would be called a mountainous region, for the hill ranges are usually far apart, and not 1500 feet above the surrounding plains, and are well below the limits of perpetual snow in Tibet; occasionally, however, mountains are met with rising 5000 to 10,000 feet above the plains, or 20,000 to 25,000 above the sea-level, and these are covered with snow all the year round. In many parts the passing traveller sees nothing but plains around him up to the sky-line. The plains are coated with a short succulent grass, forming from May to August the softest of green carpets, and furnishing an abundance of pasture for the flocks and herds of the Tibetan nomads, and also for myriads of wild animals which roam over the entire region, but mostly congregate in the uninhabited northern portion. As a rule, though grass is abundant, nothing else will grow in these highlands, no cereals nor even shrubs or trees of any description to yield fire-wood; happily, the argols of the animals by which they are overrun, furnish a supply of fuel which appears to be plentiful and unfailing; thus the grass, which in its natural state is useless for fuel, is converted by animal agency into a species of fuel which in many respects is superior to fire-wood; but for this circumstance it would be impracticable for travellers unprovided with the means of carrying their own fuel to cross the Chang-tang. There are, however, occasional spots where something more than grass will grow; in travelling across this region

from Léh to Lhása, Nain Singh found willow, tamarisk, and other trees growing round the Thachup lake at an altitude above 15,000 feet, and a little further on he met with plentiful wood and a few fields of barley at 14,400 feet; for the next 300 miles there was only grass; but then he entered a basin which is surrounded on all sides by mountains, and contains the great Dangra lake and the plains of Ombo; and here, at an altitude of 15,200 feet, he found well-built villages inhabited by an agricultural community, and richly cultivated fields which produced a profusion of barley. The establishment of such a community at so great an elevation, and the existence at this elevation of a cultivated plain enclosed by mountains, which in their turn are surrounded by boundless extents of pasture land, are very remarkable and quite unique in their way; I believe nothing of the kind is known in any other part of the world.

The Pamir highlands which are situated between the Hindu Kush and the Thian Shan ranges and between the lowlands of Eastern and Western Turkistan, are similar in many respects to the Chang-tang of Tibet, having extensive highly elevated plateaus diversified with lakes and low ridges and occasional great mountains; also an abundance of grass, furnishing pasture for numerous animals, both wild and domesticated, and no fuel but argols of which there are quantities, and wandering nomads who happen however to be Kirghiz Mahommedans instead of Tibetan Buddhists. The region between the Pamirs and Western Tibet has as yet been only partially surveyed; but there can be little doubt that there is a more or less broad belt of similarly elevated table-land lying to the north of the Mustagh range which connects the Pamirs with the Chang-tang. Thus the entire region of elevation stretches over some 30° of longitude, say 1700 miles; its average breadth is about 300 miles, its average height probably exceeds 14,000 feet, and its area is about half-a-million square miles; it gives birth to the upper sources of most of the great rivers of Asia, the Oxus, the Indus, the Sutlej, the Ganges, the Brahmaputra, the Salwin, the Mekong, the Yang-tsze-kiang, and the Hoang-ho; and it constitutes the greatest protuberance that is known to exist on any part of the earth's surface.

NOTE.—In the map (dated June 1884) which was drawn in Dehra Dun to illustrate Pandit A—k's explorations, the longitude of Sachu, the northernmost point, is 94° 2', as deduced from the route survey controlled by the astronomical latitudes. The adopted origin of longitudes was Lhása, 91° 5' 30". The value of the magnetic variation was assumed to be 2° 30' E. throughout. Subsequently the variation was ascertained to be 2° 45' E. at Darjiling in lat. 26° 56'; and Prejevalsky found it to be 3° 59' E. at Di-chu Rab-dun, in lat. 34° 45'; thus assuming it to increase with the latitude—the longitude remaining constant—it would be 4° 50' E. at Sachu, lat. 40° 8'. These three values are in fairly close accordance with those for the corresponding points in the Admiralty Chart of Curves of Equal Magnetic Variation, for 1880.

To correct the Dehra map for the difference between the adopted and the actual values of the magnetic variation, the longitudes of all places on the Pandit's route-line north of the parallel of Lhása should be increased in the following proportions—the latitudes remaining constant because controlled by the astronomical determinations:—

On parallel of 32° ..	2·4 statute miles.
34 ..	5·3 "
36 ..	8·9 "
38 ..	13·3 "
40 ..	18·5 "

Thus the longitude of Sachu should be increased by 21' of arc, bringing it from 94° 2' to 94° 23'; and this value has been adopted for the accompanying map, with corresponding alterations in the lower parallels.

Prejevalsky's value of Sachu as taken from Petermann's 'Mittheilungen,' July 1883, is 94° 26'. Count Bela Szechenyi's value is 94° 58'.

Before the paper,

The CHAIRMAN (Sir Henry Rawlinson) said that in the unavoidable absence of Lord Aberdare he had been requested to preside that evening, and he was the more pleased to resume his old functions, because the paper to be submitted to the meeting was one full of interest and importance. They had all heard that some years ago a system was adopted in India of employing native surveyors to examine the countries beyond the frontier, where European travellers or Government agents were unable to appear, and which were quite inaccessible to other attempts at exploration. This fact had been well known in England for many years past. It was originated, he believed, by Colonel Montgomerie twenty years ago; it had been followed with more or less success by other officers in the Department, and latterly it had been brought to perfection by the late Surveyor-General, General Walker, who was to address them on the subject that evening. Considering the jealousy with which the English were regarded by the wild tribes around the frontier, it was only prudent to suppress the proper names of these native explorers, and to designate them either by their titles or by mere initials. It thus happened that most of their great authorities with regard to the geography of Central Asia, especially the interior of Afghanistan, the course of the Upper Oxus, Tibet, and the line of the Indus within the mountains, were known by what sometimes were supposed to be *sobriquets*, but which really were the initials or the titles of the individuals, such as the Pundit, the Mirza, the Havildar, and more recently H—S and A—K. They might at some future time perhaps hear of the adventures—and many of them were of great importance—of H—S, but at present they had merely to do with the wanderings of A—K. The history of A—K would be given in detail by General Walker. He had certainly during the last four years performed a most remarkable journey, inasmuch as he had crossed from the extreme frontier, Darjiling, in lat. 27° right across Tibet to Mongolia, having reached Sachu in lat. 40°. From thence he made a considerable detour to the eastward, passing Darchendo and Bathang, and coming down to Sama within 30 miles of the Assam frontier at Sudiya on the Brahmaputra, but this small distance of 30 miles he could not cross. There was an impassable barrier owing to the homicidal propensities of the Mishmis, who inhabited that belt, and he was obliged therefore to retrace his steps to the north and go round by Lhasa to Darjiling, and so on to the British provinces. It was really a most remarkable achievement,

and the notes which he preserved during his journey contained a vast amount of interesting geographical detail. There was one point indeed of especial interest, for his journey afforded overpowering evidence of the identity of the great river Sanpo of Tibet with the Brahmaputra of India. It had been argued in former times both in that Society and elsewhere that the Sanpo really represented the head-waters of the Irawadi, but that heresy had been dying out, in great measure owing to the acuteness of Colonel Yule. It had not, however, entirely expired, but he thought it might be said now that A—K's explorations had settled the matter once for all. The value of A—K's narrative was further very much enhanced by the fact that his notes had been put together by the Head of the Survey Department, General Walker, whose name was a sufficient guarantee of minute accuracy of detail combined with sound general views of the physical geography of Central Asia. Without further trespassing on the time of the meeting he would now call on General Walker to read the paper which he had drawn up from A—K's notes.

After the paper,

Colonel YULE said that what General Walker had stated about the Chantang Plains and their connection with the Pamir recalled what he had often been led to think of, and which was first suggested by that splendid paper of Captain Henry Strachey's, to which allusion had already been made. He was sorry that it was the first and last paper which Captain Strachey had contributed to the Society's publications, and that was nearly thirty years ago. Describing the part of Tibet in which he travelled, Captain Strachey suggested the idea that the Pamir must be of very similar structure; and everything that he (Colonel Yule) had since read of the Pamir, as consisting of sloping valleys, flat indeed in their surfaces, but gently sloping from the upper to the lower ends, as if an Alpine valley had been filled up either with diluvial matter or by atmospheric deposits, exactly corresponded to the description of those high plains which the Tibetans called Chantang. Another notable point in connection with these high grassy plains was the enormous amount of animal life which they supported. Colonel Prejevalsky, who had seen most of the animal life in that region, having penetrated further into the northern plains of Tibet than any other European, estimated the wild yak population at millions. He also mentioned that a full-grown yak weighed between 1600 and 1800 lbs., and when they thought of millions of animals of this size living upon scanty herbage at the height of 12,000 or 15,000 feet above the sea, it did give one a most extraordinary conception of the chemistry of nature, which could evolve such masses of flesh from such a field of sustenance. Then they came to the old question of the Brahmaputra and the Irawadi. Much more seemed to have been said about modern controversies, and the part taken in them by such persons as himself, than the circumstances justified. The fact was, that but for those "heresies," as Sir Henry justly called them, which had been raised without any substantial ground in fact, within the last fifty or sixty years, there never would have been any controversy on the subject. Really the question stood now very much as it did when the most illustrious member of the corps to which he had the honour to belong, James Rennell, first described his view of the course of the Brahmaputra as descending from the Sanpo of Tibet. His rough sketch, by which he showed the ascertained course of the Sanpo, and the discharge of the Dihong (not then known by name) into the Brahmaputra, corresponded almost exactly with the facts as they had them now. Indeed he stated that the distance intervening between the reports and maps and surveys of the Jesuits in Tibet, and those which he had from the natives who had come from Upper Assam, was an interval of about 100 miles unaccounted for. The interval still unaccounted for was just about the same—100 miles. They had made

some advance as to negative facts, disproving the possibility of any exit for the waters of the Sanpo other than the Brahmaputra, and this excellent pundit A—K had added very strongly to that negative evidence; in fact, he was sorry to say that a little imagination of his (the speaker's) own had been brushed away. For many years, in comparing the maps and the evidence, he had thought there was *one* stream coming from Tibet which hitherto had been unaccounted for, and which might possibly, and did probably, form one of the sources of the Irawadi; he was afraid, however, that after this pundit's journey no such source remained. The explorer seemed to have traversed the whole of the possible space between the known rivers close to China and the known rivers nearest to India, and no room was left for such a source. He did not think there could be any foundation for the idea thrown out as possible that the Nu-kiang of the Chinese was anything else than the Salwin. They would find it in the Tibetan maps laid down very positively as the Nu-kiang of the Chinese coming down from Tibet, and the modern missionaries in that quarter maintained the same opinion. He believed they had not tracked the river absolutely, but they had followed routes parallel to it, for long journeys, and there did not seem to be any room left for doubt.

The CHAIRMAN asked whether Colonel Yule could give any explanation of the extraordinary volume of water of the Irawadi, which seemed to be incompatible with the limited extent of country it would drain if the Sanpo was really the same as the Brahmaputra.

Colonel YULE answered that he did not think he could add anything to what he wrote thirty years ago in an appendix to Major Phayre's mission. He then took a great deal of trouble with the question, and came to the conclusion that it was quite within reason that in a country which possibly had an excessive rainfall, like that at the head of the Irawadi and the head of Assam, a small number of square degrees might produce that amount of water. He discussed the matter again some years ago, when Mr. Gordon, in a section of a large work on the Irawadi, had endeavoured to demonstrate the truth of the "heresy" (as we have ventured to call it), and what was said on that occasion would be found in the 'Proceedings' of the Society.

In answer to a question from the Chairman as to whether he would like to say something on the side of the Irawadi, Mr. GORDON said he did not believe that justice had ever been done in the Society to the question of the connection of the Irawadi with the Sanpo. He himself offered to read a paper on the subject last session, but the Council declined to receive it. He had looked through the papers for many years, but they did not contain a single statement on the Irawadi side of the question, though there was a great deal of assertion on the other side. He was bound to say that General Walker had treated him with the utmost courtesy for the several years that he had been working on the subject, but still it had never been fairly treated in the Society. He could not do justice to it now, because in order to do so he should require as much time as had been occupied by the paper, and therefore he had better say nothing further on the matter.

Mr. CLEMENTS MARKHAM thought the meeting would be the more struck with the great value of the travels of these pundits, and of the geographical services of General Walker, Colonel Montgomerie, and Mr. Hennessey, when they remembered that if it had not been for those journeys, and for the elaboration of the work of the travellers, they would be entirely ignorant of the whole country north of Lhasa, except from what they could learn from travellers who wrote in the last and previous centuries. It was more than seventy years since any Englishman was at Lhasa, and only one Englishman had ever been there. With regard to that vast plateau

comprised in the province of Chang to the north of Lhasa, it was 150 years since it had been traversed by any European, and he thought he was right in saying that only one European ever had traversed it from Lhasa to China, returning by the same route. The man he alluded to was a Dutch traveller of good family, a native of Flushing.

The CHAIRMAN remarked that there were also Huc and Gabet.

MR. CLEMENTS MARKHAM said that Huc and Gabet did not travel across the plateau from Lhasa to Sachu, and return by the same route. The name of the Dutch traveller to whom he alluded, was Samuel Van der Putte, but unfortunately when he was dying at Java, being afraid that an improper use would be made of his journals, he burnt them. They, however, had some account of his experiences in the journey from Lhasa to the north, in about 1729, derived from the Capuchin Friars then established at the Tibetan capital, who received their information from Van der Putte. Horace de la Penna, one of these Friars, has preserved a few details. From these it would appear that the Dutch traveller came to a palace called *D-am* after several days' journey northward from Lhasa. This may be the *Shiabden* of the Pundit. He then reached a great river which he called *Biciu*, apparently the *Dichu* of General Walker, the upper course of the Yang-tsze. It took him a day and a half to cross this river, being detained on an island in the mid-stream. Hence I assume that he struck it at a lower part of its course, and consequently must have crossed the plateau rather to the east of the Pundit's route. It was a striking fact that during the last century, and especially during the latter part of it, when Warren Hastings was Governor-General of India, Englishmen and other Europeans actually penetrated to the central parts of Tibet, and there was also communication by post. He held in his hand a letter from one of the Grand Lamas of Tibet to the agent of Warren Hastings, which came by post. Englishmen were now entirely excluded from that country, and it was important that the barrier should be removed. He would express the hope that Mr. Ney Elias, if he was present, would give them some account of the views that he held as to the possibility of renewing that intercourse which existed some hundred years ago between the English authorities in India and the governing classes of Tibet.

MR. DELMAR MORGAN said, looking to the value of the work done by these pundits, it was very much to be regretted that Europeans did not push forward into these countries, bringing back the results of their observations which could not fail to be of great interest. The natives employed in this work, though very intelligent, had no special qualifications for observing those facts of natural science which would be observed by Englishmen. He was glad to hear that the Royal Geographical Society were thinking of devoting some of their surplus funds to the exploration of Central Asia; he only wished they had done so before, for scarcely anything had been done for the last ten or fifteen years with reference to this work in Central Asia. He thought it was a great pity to leave it to Russians, to Austrians, or to any one else to carry out these explorations. He suggested that probably the work of Colonel Prejevalsky, a German translation of which was noticed in the last number of the 'Proceedings,' was well worth the attention of the Royal Geographical Society, and if they would undertake its publication he should be very happy to give any assistance in his power in the way of translation.

SIR RICHARD TEMPLE said he had not had the advantage of receiving beforehand a copy of the paper, and they would therefore understand that he was entirely unprepared to speak. Nevertheless, being called upon by Sir Henry Rawlinson, who was among the very greatest of Asiatic geographers, politicians and antiquarians, he was of course bound to obey the call. As they were aware from what had fallen

from Mr. Markham, no Englishman of that generation had penetrated into Tibet, but he had himself passed as far as the threshold of the Promised Land. When he looked back upon the glories of that country, when he thought of the picture gallery which was in the interior of his brain, and of the pictures impressed upon the tablets of his mind—of the cloud banners, of the snowy peaks, piercing blue sky, of the dark umbrageous forests, of the flocks of sheep and goats and yak, of the sparkling rivulets, the frozen lakes, and the tortuous, difficult passes through which he used to climb—when he thought of all this the imagination of such a retrospect was truly exciting. But with regard to what had just fallen from the last speaker he must explain that it was all very well to say, “Why do not Englishmen penetrate to these regions, when Englishmen used to penetrate them a hundred years ago?” Let him remind them of the vast political changes which had come over the Chinese Empire. In the last century the Chinese were willing to cultivate intercourse with the English, and with their great representative, Warren Hastings; but various things had now supervened, in consequence of which the Chinese jealously excluded them from Tibet, for Tibet was really a portion of the Chinese Empire. There was a Chinese resident and Chinese troops at Lhasa, and indeed Tibet was to the Chinese Emperor what the Native States of India were to the British Queen. By Chinese policy they were thoroughly excluded from Tibet. He could assure them that this was the case from his own experience, for he had been as far as the frontier and could tell them how absolutely the passage was barred. That being so, what was the use of saying, “Why don’t we penetrate?” They could not penetrate except at the risk of bloodshed, which would bring on political complications and might lead to war. There were certain morals to be drawn from the paper which had just been read. They had seen the vastness of the natural resources of Tibet. Colonel Yule had justly pointed out the marvellous manner in which sustenance was provided by the Creator for the countless individuals that formed the animal creation there; but they must remember that every one of those many millions was a valuable entity. The wool, the hair, the horns, the hoofs, the very tails of those animals were valuable, and among them, too, there were some that could be conveyed as living flocks and herds to Darjiling, the adjacent British territory; he alluded particularly to the sheep and the goats. They must remember also that as they had a great empire in the East, so they had a corresponding duty towards all the adjacent region. It was science, as represented by General Walker that evening, that was the pioneer of civilisation, and geography was the handmaid of science. A second moral to be drawn from it was the remarkable manner in which geography was from time to time verified. They had been told that the observations of this native surveyor had been compared point to point, detail to detail, and particular to particular, with the antecedent narratives of the gallant Frenchman Huc, and the late lamented Englishman Gill. The native surveyor could not possibly have known what those observers had said, and, therefore, when his records and journals and explorations came to be compared in the office at Calcutta by so trained an officer as General Walker, and were found to correspond often in minute respects, the verification thereby afforded was eminently to the credit of science and geography. There was yet another moral to be drawn by British people from this remarkable journey, viz. that their native fellow-subjects in the East were after all possessed of qualities which rendered them worthy citizens of the British Empire. Let them consider the skill, the endurance, the resolution, the patience, the capacity shown by this native gentleman. Had he been an Englishman he would have possessed the stimulus afforded by a liberal education, but as they were told, he was a comparatively uneducated man. Had he been an Englishman he would have looked forward to returning to his native land, where

the applause of the public, the thanks of Parliament, the gracious approval even of the Sovereign would have awaited him. But what had that poor man to look forward to? Not to those honours which afforded an honourable stimulus to British enterprise, but only this, his zeal for the Department he served, his obedience to so good a superior as General Walker, his loyalty to the public service, his firm determination to do his duty according to his poor ability, and, above all things, his reliance upon that British Government which he knew would reward him generously should he survive, and would take care of his family should he perish while on service.

The CHAIRMAN, in closing the discussion, said a great deal of interesting information no doubt might be obtained from many gentlemen present had time permitted. As it was now past their usual hour, he must sum up in a very few words. In the first place, he wished to call their attention to a subject which had been alluded to both by Mr. Markham and by Colonel Yule, and indeed by all the speakers, namely, the value of Tibet in a commercial point of view. General Walker's paper had been chiefly addressed to the adventurous journey of the Pundit, but it was valuable in many other respects, especially in stimulating inquiry as to the trade and productions of Tibet, which might become a subject of national importance. He hoped it was not the case, as so often stated, that they were finally or permanently excluded from Tibet. It was only indeed within the last month or two that a very favourable opening had been created for further communication between India and Tibet. They had probably recently seen a most interesting account in the *Times* of the mission of Mr. Colman Macaulay from Darjiling to meet the Tibetan authorities on the frontier at the end of Lachen Valley. The distance was only 100 miles from Darjiling, and Mr. Colman Macaulay had there met the Tibetan authorities, and made all preliminary arrangements for the resumption of commercial intercourse between the countries. What this remarkable intercourse was likely to lead to was exemplified in a couple of paragraphs, which he would take the liberty to read, because they showed the practical value of opening up Tibet. The *Times* said, "We hear complaints everywhere of the stagnation of trade. Here is a large market waiting if we only insist on admission. The Tibetans prize broadcloth above all things; they have begun to learn the use of piece goods, and a demand to which there is hardly any limit is springing up for them. Knives and hardware of all kinds are eagerly sought; they are large consumers of tobacco and indigo; and, even with the existing restrictions on trade, the staples are gradually increasing. As regards tea the question is not clear; but it is an instructive fact that within 100 miles of Darjiling is a people which drinks tea morning, noon, and night, which uses practically no other beverage, and yet obtains its supply from districts of China 1200 miles away. With respect to the return trade, the chief articles would be gold, musk, live-stock, and, above all, wool and woollen goods. The quantity of sheep's wool and of the fine wool of the shawl goat available is prodigious; and it is now almost worthless from the absence of demand. Doubtless other articles of trade would appear as commerce developed. The richest part of Tibet is practically within a stone's throw, and the inhabitants, who are from the highest to the lowest keen traders, are debarred from intercourse with India through sheer ignorance and the tenacity of tradition." That was a most important illustration he submitted of what might happen from the opening up of Tibet, and it certainly afforded a very favourable prospect for renewed trade with that country. The experiences that had been gained would, he hoped, lead up to that result; for it was quite true, as Sir Richard Temple had remarked, that the difficulties in the way were political more than anything else. The Geographical

Society, at any rate, would be very ready to encourage exploration in Tibet and the contiguous countries; but if political difficulties supervened they could hardly be expected to commit the Government by premature attempts to force an entry into the country. They must wait for matters to be conducted in the regular diplomatic manner, and he had every hope that as all parties now had their eyes open to the importance of the subject, a favourable issue would result. With regard to the geographical questions involved, which were of large interest, he only hoped that Mr. Gordon on some future occasion, if he thought he had a case for identifying the Sanpo with the Irawadi, would be prepared to bring it before the Society who would give it a patient hearing. For his own part he confessed that he regarded that identification as a heresy, but still heresies did sometimes turn out to be true, and it was possible that it might be the case in that instance. The paper to which they had listened was a most valuable one, and they were greatly indebted to General Walker for bringing it before them. Although General Walker's name was very well known to the Society and to all geographers, yet he had not received, in Sir Henry's opinion, that share of public acknowledgment to which his services entitled him. It was only by a careful comparison of the skeleton maps of Central Asia published ten years ago with the highly improved edition of the map of Turkistan which General Walker had recently issued, that they were able to realise the enormous amount of new geographical information which had been acquired during the last few years while he had been in charge of the Surveyor-General's Office in Calcutta. It was only through such a comparison that they could appreciate the value of the services which had been rendered to geography. General Walker had no doubt employed many native agents for this purpose; he had filled up many blanks in the map of Asia, but his crowning success had been this marvellous journey of the Pundit A—K. He must remind the meeting that A—K was really General Walker's own creation; for they were indebted to the General, not only for the scientific preparation of the individual and for the organisation of the expedition, but also for the utilisation of the results. Without an experienced and commanding head to have reduced those rough notes and books to order, all this exploration and this expenditure of skill, of industry, and of courage, would have been in vain. For the utilisation of the Pundit's work they were indebted to General Walker himself. With regard to the Pundit himself, it would remain for the Council of the Society to consider in due course, as they had considered in previous instances, what might be assigned to him as an appropriate reward for the skill, the intelligence, and the courage he had shown in this journey; but in the meantime, while they left the reward of the Pundit in the hands of the Council, they might now as a body, at any rate, express their deep acknowledgments to General Walker for the support which he had given to the Pundit, and for the admirable manner in which he had brought his results before the meeting.

European Territorial Claims on the Coasts of the Red Sea, and its Southern Approaches, in 1885.

By Sir RAWSON W. RAWSON, K.C.M.G.

Map, p. 136.

Much has been said, written, and ignorantly repeated concerning the occupation of various localities in the Red Sea, and at its southern entrance, but very little is generally known as to the real position of European authority in these parts.

Accurate information will serve to throw useful light upon this subject, which has acquired a special importance at the present time. It may also tend to dispel some misconceptions and some extravagant illusions, which have aroused some no less exaggerated apprehensions; while it will satisfy the desire, which all must feel, to possess some guide, by means of which to judge of the character and importance of the broken intelligence that reaches us from time to time from this quarter.

It is much to be hoped that one of the results of the Congress now sitting at Berlin will be the establishment of some rules with regard to the accomplishment and promulgation of the acquisition, or annexation, of unoccupied lands, or of lands occupied by more or less uncivilised races, under the sway of chiefs, whose authority is often as undefined as the limits of their territories, and whose rights of ownership are as little known as the nature of their interdependence, and their subordination to superior authority.

At all events, the proceedings of the Congress will help to familiarise the public with the wide difference, and many intervening steps, between occupation, protection, and annexation, between proprietary and territorial rights, between the recognition of private ownership and of national dominion, and with the necessity for discriminating between them, when endeavouring to acquire information as to the constantly shifting aspect of political geography, or when forming a judgment upon the actions of public men and Governments in connection with territorial acquisitions and changes.

To many, who have not had occasion to consider these matters, it may be useful to point out:—

1st. That the purchase of a tract of land in any country, uncivilised or partially civilised, by subjects, one or many, of a foreign nation, can no more give territorial rights to the purchasers, or to the nation of which they are the subjects, than it could in a civilised country.

2nd. That the purchase, or acceptance of the cession, of territorial rights by private persons does not constitute, or necessarily involve, annexation by the nation to which they belong.

3rd. That a local authority, subordinate to a central or superior authority, even if it should have power to dispose of its proprietary

rights in any of its lands, has no power of itself to cede territorial, or sovereign, rights over those lands.

4th. That the transfer of any proprietary, or territorial, rights from the subjects to the Government of a foreign nation, can confer no greater rights upon the latter than were legitimately acquired by the former.

The operation of these elementary rules will be amply illustrated in the following condensed narrative of the acquisitions of territory on the Red Sea by European nations, to understand which it is necessary to go back to the commencement of the 16th century.

On the 1st January, 1517, the Turks defeated and overthrew the Egyptian army in Syria. Within a few weeks they had entered Cairo, and dethroned, and ignominiously put to death, the last of the Mameluke rulers of Egypt. Thereupon the Sultan, Selim I., took possession of that country, divided it into twenty-four military provinces, and appointed a Bey over each, and a Pasha (Bassa or Basha, as it was written at that time) as Viceroy, over the whole. The limits of Egypt Proper at that date do not appear to have reached beyond the Tropic of Cancer, or about 23° 40' N. lat. During the next century they were extended, by the addition of what was then called Turkish Nubia, to the 21st degree; and there can be no doubt about them at the present day, as the Porte, in its Firman of 13th February, 1841, by which it ceded, or delegated, its authority in Egypt to the Khedive and his descendants, fixed the boundary on the west coast of the Red Sea at the Bay of Roway (Raweyyah), in N. lat. 21° 5'.

But Turkey claims, and up to the second half of the present century has claimed without dispute on the part of European Powers, the whole of the western coast of the Red Sea, from the Bay of Roway "to beyond the Straits of Bab-el-Mandeb," as described in its cession of this part of its territory to Egypt by the Firman of 27th May, 1866, confirmed by that of 8th June, 1873, and as far as the Port of Zeila, in lat. 11° 20' N., ceded to Egypt by a Firman of 1875.

The grounds of its claims, as represented on its own behalf by the Egyptian Government, and the opposite view as represented by the Italian Government, which claims the liberty of assuming territorial rights on a certain limited portion of that coast, are set forth in the correspondence between the British and Italian Governments respecting Assab Bay, which was laid before Parliament in 1882.* From these sources, corrected by a reference to the original authorities, sufficient may be gathered to furnish the means of forming a tolerably accurate idea of the nature of those claims, as they affect past, and possibly future, acquisitions of territory on the Red Sea.

Dr. Beke, in an official Memorandum of 12th November, 1862, has, with almost unimpeachable accuracy, summarised the actual position of the question at that date. He says:—

* Parl. Papers, 1882, c. 3300.

"That strip of low country along the western coast of the Red Sea, from the Straits of Bab-el-Mandeb northwards, belongs geographically to the adjacent empire of Abyssinia, which, however, appears not to have ruled over any portion of it for several centuries.

"Legally, the Abyssinian coast has belonged to the Ottoman Porte since the year 1558, when the Turks drove the Portuguese out of the Red Sea, and took possession of it, and all its harbours and coasts, in the name of the Sultan, in his character of Caliph, or head of the Mahommedan faith; though they, too, have only occupied the islands of Suakin and Massowah (Sawákin and Musawwá), with occasionally some adjoining districts on the mainland.

"Practically, these coast lands belong to the several native tribes inhabiting them, who claim to be independent; though from their defenceless state, as well as that of their country, they have to acknowledge the supremacy of Turks or Abyssinians, accordingly as the one or the other have the means of coercing them." *

The historical evidence in support of this statement is very interesting. The strip of which Dr. Beke speaks is the tract of low, almost waterless, desert land extending from the sea-shore to the base of the hills which have been the bounds of the Abyssinian, or Ethiopian, empire for centuries. The area is about 80,000 square miles, the population 400,000.

This strip at the northern end, in the neighbourhood of Massowah, at the northernmost boundary of Abyssinia, does not exceed 20 to 30 miles in width; it gradually expands; and towards the south, beyond the limits of the Red Sea, where it adjoins the lands of the Galla and Somal tribes, it attains a width of almost 200 miles. This is the territory now claimed by Turkey, or its representative, Egypt. It is a disputed point whether it ever belonged to Abyssinia, or even to the larger empire of Ethiopia; and there is no evidence of that country having exercised any authority over the nomad tribes inhabiting it greater than that exercised by Turkey since the middle of the 16th century.

Ludolf, speaking of Abyssinia, says that "towards the East it was formerly bounded by the Red Sea"; † but the evidence points to the probability of his remark applying solely to the northern province of Tigré, of which he says, "The most noble part of it lyes toward the Red Sea, and is called Bahr, the Sea, or Medra Bahr, the Land of the Sea, or a Maritime Province," ‡ through which the route lay, and still lies, to Arkiko (Harkíko) and the Island of Matzua, Massowah of the present day. In another place he states that "as for the Abyssinians themselves, they are utterly ignorant of navigation; . . . nor have they any Ports

* Parl. Papers, 1868, Correspondence, Abyssinia, 1846-68, p. 214.

† Ludolf's 'History of Ethiopia,' l. i. c. 2.

‡ Ibid., l. i. c. 3.

"upon the Red Sea."* With regard to Zeila, he calls it "a Port belonging to the Adelans, altogether unsafe because of the deadly hatred between them and the Habessinians."†

Certain it is that at the commencement of the 16th century the southern part of the coast was peopled by wild tribes of Mahomedans under the king of the Dankali (plur. Danakil), and that the northern part comprised that part of the more extensive kingdom known to the Abyssinians as Adela, or Adál, which was called by the Arabs Afer (or Afar, signifying Men). Ludolf states that the Prince of the Dankali, who commanded the Port of Baylur (or Beilul), was a friend of the Abyssinians, but that the Adelans were "their ancient enemies."‡ After the Turks had vanquished Egypt, and some parts of the Red Sea, the Adelans, strengthened by their assistance, invaded Abyssinia under the leadership of the celebrated Granye (Gragne), and overran the whole country. This lasted from 1526 to 1540, and the land was brought to great misery. In these straits the Abyssinian king, driven to seek shelter in the recesses of the mountains, besought the succour of the King of Portugal, John the Third, who despatched to his aid Christopher Gamas, a son of the celebrated Vasco, with 450 musqueteers and six small field-pieces. Their arrival turned the tide of fortune for a time; but next year Granye defeated Gamas, and slew him and the greater part of the Portuguese, who were reduced to 120 in number. The Abyssinian king, having "had intelligence that the Turks were returned home, leaving only 200 behind them," attacked and routed Granye, who was killed by a shot in the battle.

In the meantime the Gallas, till then neglected as an obscure nation, though they had invaded many provinces already laid waste by the Adelans, caused serious damage to the kingdom; and after a while, during the reign of David's successor Claudius, the Adelans, having repaired their losses, and awaiting their opportunity, again broke into Abyssinia under Nurus (Nour), their captain, overthrew the king in 1559, and put him to death. He was succeeded by his brother, Menas, who by his cruel conduct and misgovernment provoked a civil war, in which he was defeated with the assistance of the Turks, and put to death in April 1562, "to the great detriment," Ludolf says, "of Habessinians; for ever since that time the Turks have been masters of the coast of the Red Sea."§

His son, Sarza-Denghel, or Za-denghel, a brave and wise ruler, "first drove the Turks, who were masters of Dobarva, the metropolis of the maritime Province, out of Tigré. He would also have driven them out of the Port of Arkiko and the Island of Matzua, had he not been recalled to defend his upland dominions from the incursions of the Gallans."|| No further mention is made of any attempt to expel the Turks, or of wars

* Ludolf, l. i. c. 8.

† Ibid., l. iv. c. 6.

‡ Ibid., l. i. c. 2.

§ Ibid., l. ii. c. 6.

|| Ibid., l. ii. c. 6.

with the Adelans. Za-denghel was fully occupied with his struggles with the Gallas, and then with an internecine war, in which he was killed in 1579. There appears to have been no further recorded connection between the affairs of Abyssinia and Turkey affecting the position of the latter on the Red Sea, up to the middle of the present century.

That position at the end of the 17th century is fully described by Ludolf, whose work was first published in 1681.* After stating, as already quoted, that towards the east Abyssinia was formerly bounded by the Red Sea, he proceeds thus:—

“But now the Port of Arkiko, with the adjacent Island of Matzua being taken, all the coast obeys the Turk, who are masters of that sea. A sea that affords but little convenience for Harbors, full of Shelves and Quick-sands, and besides that the Islands which belong to it are untill’d, ill inhabited, and laboring under such a scarcity of water in the midd’st of the sea, that they neither afford accommodation nor security to strangers, for which reason they are but little visited. The mouth of the Streight is very narrow, and of so ill a fame for frequent shipwracks, that the Arabians call it Bab-el-Mandeb, the Port of Affliction.”†

Further on he writes: “The most cruel and bloody war which the Inhabitants of Adela waged in the foregoing century under the conduct of their Captain Grainus against the Habessines, so ruined their affairs, that they could never since recover their losses. From whence, as well the Turks as the Gallans have taken an occasion continually to vex them with wars and wastful inroads. And first, the Turks after they had possess’d themselves of Egypt, and slain the King of the Mamalukes, sent a fleet into the Red Sea, to secure the Indian Navigation, which is vastly profitable to Egypt: for that the Portuguesees, to the intent they might enjoy the sole trade of India, took all the ships of the Saracens they could meet with, pretending a hatred of their religion. The Turks therefore to shut up all the Ports of that Sea, made themselves masters of Suaqena and Matzua, Islands that formerly belonged to the Habessines, which they might the more easily do, in regard the Habessines having their handsful by land, took no care of their sea affairs. But soon after they became sensible, how vast an inconvenience it was to have so powerful a neighbour; finding what potent succour of men and Fire-arms the Turks sent to assist their enemies, and those that revolted from them. Nor are they less frequently sensible of it to this day; in regard that neither men nor merchandize can be admitted into the Gulph, unless they request it from the Basha or his Deputies, with vast expenses of rich Presents.”‡

* A translation of it was published in London in 1684.

† Literally, “Gate of weeping,” or, according to the Nubian Geography, Bab-almandab, i. e. “The dreadful Mouth,” Ludolf, l. i. c. 2.

‡ Ludolf, l. i. c. 16.

Heyd confirms this by the statement in his 'History of the Levant Trade in the Middle Ages,' that in the early part of the sixteenth century, the merchant vessels of the Musulmen moved about without any hindrance from a Portuguese fortress or a Portuguese man-of-war, so long as they confined themselves to the Red Sea, but that if they ventured into the Indian Ocean, they were sure to meet with destruction.* In 1539, however, Suleyman Pasha, Governor of Egypt, on his return from an expedition to Gujerat, made himself master of Aden and the province of Yemen; and again in 1569, one of his successors, Sinan Pasha, reconquered both the town and province, which had revolted. It does not appear consistent with this manifestation of the power of the Turkish Viceroy in Arabia, that they should have failed to place under subjection the tribes on the western shore of the Red Sea, of whose ports they held the keys.

With regard to Suakin, Ludolf observes casually, that the King of Sennar, or Fund (the Funj or Fung) "formerly a tributary of the Abes-sines, but now absolute," possessed a part of the ancient Nubia, "near to which adjoyn'd the kingdom of Balou; their king was formerly lord of Suagena, and in friendship with the Abessines; now he only receives the half of the Maritime Tribute from the Turks,"† who were consequently masters of the port, and probably of the country, at that date.

With regard to Massowah, Mr. T. C. Plowden, publishing in 1868 the papers of his brother, late British Consul in Abyssinia, writes as follows:‡—

"The island of Massowah is now in the hands of the Turks, who have also a fortress on the mainland at Dohona (Arkiko), and who claim, by various titles, the sovereignty of the coast generally, from the sea to the highlands of Abyssinia; and they extract from the various tribes as much tribute as they can by means of the Naib, now their lieutenant on the mainland, but whose ancestors having been for some years independent rulers, possesses a certain influence over the scattered tribes.

"Massowah is an island situated at the entrance of a large bay which forms between it and the mainland a small but secure harbour, &c."

"At the bottom of the bay is the town of Dohona (Arkiko).

"The Turks at present occupy Massowah. The establishment consists of a pasha, a custom house, about 250 Nizam, and 200 Arnauts, or irregulars, with their respective officers. Massowah and the adjacent territory were first seized in the time of the Sultan Selim, when a fort was built at Dohona, whose ruins are still visible. Subsequently, when the Turkish power was still vigorous, a Naib (lieutenant) was appointed for the government of the mainland, and now lately of Massowah also,

* Heyd, vol. ii. p. 538.

† Ludolf, l. i. c. 16.

‡ W. Plowden's 'Travels in Abyssinia,' edited by T. C. Plowden, pp. 2 and 355.

on a salary of 1000 dollars per month. This family of the Naib is Teegray" (Tigré) "in origin, but having become Mahommedan, gradually separated this country and authority from Abyssinia, on the break up of the empire, probably about the time of Mohamed Gryne's (Granye's) invasion. They were the acknowledged chiefs of the country when appointed Naibs by the Turkish pasha of the Hedjaz" (in Arabia). "Subsequently the Turks almost entirely abandoned the colony" (on the mainland) "and indeed left only some 30 irregular soldiers as a guard of honour to the Naib, who became almost independent, and resided alternately, as the lieutenant of the Sultan, at Arkeeko and Massowah."

During the present century their power became restricted. Upon a family quarrel an appeal was made to the Pasha of Jiddah. He proclaimed and invested one of the rivals, who "became thenceforth the acknowledged vassal of the Pasha, and resided at Dohona, having power only on the mainland, under a certain surveillance cautiously exercised by the Kaimakan, or Governor, of Massowah. The country, however, shortly after (in 1846) reverted for a short time to the Pashalic of Egypt, and under the vigorous administration of Mahomet Ali soon made more effectual progress."

In the early maps of the Red Sea the upper part of the west coast is marked, as already stated, as belonging to Egypt down to about $23^{\circ} 40'$ N. lat.; thence at a later date as far as the Bay of Roway, $21^{\circ} 05'$, as Turkish Nubia, and the remainder as belonging to other kingdoms or native tribes.

In a map published by G. de Lisle at Paris in 1707, Egypt is marked as above; Nubia from $23^{\circ} 40'$ to Suakin in $19^{\circ} 30'$, which place is noted as belonging "au Turc"; thence to $14^{\circ} 45'$ a belt along the coast is marked "Côte de Habesh" (= Habessia, Abyssinia) and inland "Royaume Baloua." Massowah lies in $15^{\circ} 45'$ N. lat. From $14^{\circ} 45'$ to $11^{\circ} 50'$ the coast is marked "Re des Dancali," and south of it the kingdom of the Gallas, which extends southward to 5° N. lat. Eastward of the Gallas is marked the kingdom of Adel or Zeila. The towns of Zeila and Berbera are placed in a province called "Barragian" (Barr Ajan, the Azania of the ancients). On the coast both Massowah and the island and port of Adefila (Amphilla, or Hamfilah) are marked as belonging "aux Turcs." In a map published by D'Anville in 1749, the country on the coast north of Massowah is marked as Turkish.

Mention has been made of two trading ports on the west coast of the Red Sea. The Turks held both of these, Suakin and Massowah. There is a third, which was once of much importance, Adulis, now in ruins, which is represented to-day by Zulla, two miles distant from it, on the western shore of Adulis, or Annesley, Bay. This has been called "an Abyssinian port," on the alleged authority of Heyd. But Heyd does not call it an Abyssinian port. He says that merchant vessels

brought African produce from Ethiopia to India by way of, or through, the harbour of Adulis.* The trade of this port ceased early in the sixteenth century, with the disruption and decadence of the Ethiopian empire, and with the opening up of the direct route to Europe by the Cape of Good Hope. So that, thenceforth, up to the reopening of the Red Sea route by Alexandria and Suez in the present century, the Red Sea became, in fact, what Consul Plowden called it in 1854, a Turkish lake. "The Red Sea from Suez to Bab-el-Mandeb is a Turkish lake, and the Turks have possession of every harbour worth mentioning on either shore."†‡

Other places indeed exist south of Zulla which have been called ports, Amphilla, where Munzinger landed in 1869, Edd, which a French company bought in 1840, Baylur, where the Patriarch landed on his return from Portugal in 1625; but none of these possess, or ever possessed, any considerable trade, or sources of trade, or offer any shelter or accommodation for shipping. Both Tajura and Zeila are outside the Red Sea.

The above appears to complete the historical record of the possession and exercise of Turkish territorial rights on the west coast of that sea up to the close of the last century. It is impossible to say whether, among the "various titles" which Mr. Plowden states the Sultan to possess, the unpublished annals of the Porte may disclose other than those above described. The Egyptian Memorandum does not set them forth. After the opening up of the Cape route to India, and the stoppage of the Indian trade route through Egypt, which Lefebvre says was the effect, and not the cause, of the decadence of the Ethiopian Empire,‡ Europe took little or no interest in the commerce of the Red Sea; and whatever evidence there may be of the absence of constituted authority on either coast, there is none of the expulsion of Turkish forces, or the rejection of Turkish authority, on the west coast, such as is recorded on the opposite coast, where, in 1630, the Turks were expelled from the district of Yemen. Upon this point the Egyptian Government claims that the Turkish sovereignty was established in the sixteenth century; that this sovereignty, which has not been affected by any but temporary and unimportant interruptions, promptly terminated, has never been contested by any European Power, has never been alienated by the Porte in favour of any other authority whatever, until it was transferred by the latter to Egypt.§

* "Ganz ohne Rivalen waren die Perser bei ihrem Handelverkehr mit Indien nicht. Auch aus dem christlichen Königreich Äthiopien fuhren vom Hafen Adulis ab Handelsschiffe nach Indien, um afrikanische Produkte z. B. Wiehrauch, Cassia, Smaragde, auch Elfenbein welches Äthiopien in grösserer Menge besass, dort zu verkaufen und, Indische Waaren als Rückfracht einzunehmen."—Heyd, vol. i. p. 12.

† Parl. Paper 1862, Abyssinia, p. 128.

‡ Report of the French Commission, 1839-43. Introduction, p. 87.

§ In its Memorandum of 17th May, 1880. Parl. Paper 1882, Assab Bay, p. 53.

There is, however, one other title referred to by Dr. Beke, which can only be stated, not discussed, in these pages, namely, the rights of the Sultan, in his character of Caliph, or head of the Mahomedan faith. It is a question for jurisconsults to determine what territorial rights his authority as Caliph would give him over the lands of peoples or tribes who admitted that authority; whether the *dominium* over the land could be separated from the sovereignty over the people. It is a fit subject, however, for inquiry, whether this authority was admitted by the tribes on the west coast, and as there does not appear to be any distinct evidence on this point beyond that already adduced, it must be left to the reader to form his own opinion on the subject. The preference of ecclesiastics and missionaries for one or other route, when desiring to penetrate into Abyssinia with the least possible risk in the seventeenth and eighteenth centuries, can afford no evidence; and the denials of Turkish authority by local chiefs, and claims to the right to dispose of their lands to foreign countries made in the present century, cannot assuredly be admitted as evidence of their true relations in past times to the Ottoman Porte. Neither can the observations of travellers, and still less the statements of interested agents, contribute much reliable testimony with regard to those relations.

As long as its authority was not disputed on the western coast of the Red Sea, Turkey appears to have deemed it unnecessary to manifest it by asserting it openly; but when, in anticipation of the opening of an overland route to India, European nations began to bestir themselves in these parts, it took action, but not immediately. When England took possession of Aden in 1839, Turkey had no occasion to move: it had ceased to have any claim upon Aden and the province of Yemen for two centuries. When Louis Philippe sent a scientific expedition into Abyssinia in the same year, Turkey did not deem it necessary to assert its claims. When, in 1840, a Nanto-Bordelaise company bought a tract of land at Edd, on the west coast (N. lat. 14°), it was treated as a private purchase, no question of territorial rights being claimed by the purchaser, or by the French Consul at Massowah, to whom the land was transferred. When England, in 1840, entered into an agreement with the Sultan of Tajura, and purchased the islands of Mussa and Aubad (so spelt in the Treaties of 1840 = Musha and Efat or Ivat), Turkey remained quiescent; they were all outside the Straits of Bab-el-Mandeb. When England in 1857 took possession of the island of Perim, and in the following year occupied the island of Kamaran, both on the Arabian shore of the Red Sea, the Porte had no ground for objection; they were beyond Turkish jurisdiction.*

But when, in 1859, France sent agents to Negussie, the temporary usurper of Tigré, one of the provinces of Abyssinia, and obtained from him the concession, not only of Arkiko on the coast, which Turkey had

* The circumstances of these transactions are detailed further on.

conquered in the sixteenth century, and had held without dispute up to the present time, but of the island of Dessi (Deser) at the entrance of the bay Adulis, and of Adulis on the shore of the same bay, of which, if they had ever belonged to Abyssinia, that country had lost possession at the same time as of Arkiko, the Porte remonstrated. The French Government did not take, or did not retain, possession of any of the places; and in 1862, on the 20th March, Consul Cameron reported that the Turkish flag had been planted at Dessi and Adulis, and further south at Edd; governors had been appointed at the two former places, and a sheikh of the country placed in power at Edd. In the same despatch the Consul wrote that the Turkish Government intended to extend its hold on the coast to Bab-el-Mandeb; that the Governor (Turkish) of Massowah meditated planting military colonies along the frontier; and that Theodore, the King of Abyssinia, entertained the determination of overrunning the "Turkish possessions on the coast."* These extracts show the relative position of the two Powers on the coast in 1862.

At that time Turkey had conferred sovereign rights upon Egypt only as far south as the Bay of Roway, 120 miles north of Suakin. But in 1866, by a Firman dated 27th May, it extended these rights over the Kaimakanates (Governments) of Suakin and Massowah. The bounds of these governments are not anywhere described, but they are shown in Stieler's map of North-east Africa (1883) and in Keith Johnston's map of Egypt and the Soudan (1884), from which they have been copied in the map annexed to this paper; and the Egyptian Government asserted in 1880 that they embraced "the whole of the west coast of the Red Sea, from the Bay of Roway (the limit of Egypt Proper under the Firman of 1841) to beyond the Strait of Bab-el-Mandeb."†

The Egyptian Government affirms that in the autumn of the same year it took steps to assert its rights by hoisting the Egyptian flag at different places on the coast, and among them at Roheita,‡ south of Assab, up to which point, previously, in 1862, the Sheik Ahmed Amir, "appointed by the Turk Mudir and Governor of the Dankali coast," had planted the Turkish flag;§ and that again in 1871 Mountaz Pasha visited the coast from Massowah to Berbera, and hoisted the Egyptian flag at Zulla, Mak'Anli, Harena, Mogdar, Amphilla, Beilul, Roheita, Tajura, and Bulhar. At a later period it was hoisted at Berbera, Bandar (Ziy'ada?), Haloula (Aluleh), Fahouni (not marked on any map), Ali Besh-Quail, on the Somali coast, as far as Ras Hafun.|| It is certain that until Great Britain took steps in 1883 to induce the Egyptian Government to withdraw its troops from the Soudan and the country beyond, they

* Correspondence, Abyssinia, 1862, p. 209.

† Correspondence, Assab Bay, 1882, p. 55.

‡ Ibid., p. 61.

§ Ibid., p. 59.

|| Ibid., p. 61.

were in possession of Tajura, Harrar, Zeila, and other places, beyond the Straits of Bab-el-Mandeb, and that at the present day they occupy Zeila, under the Turkish Firman of 1875.

In further confirmation of the Egyptian statement the British Government applied to the Porte in 1867 for leave to cross its territory at Annesley Bay, before the expedition against Abyssinia; and in 1869 Munzinger found a Turkish flag-staff planted before the chief's house at Amphilla, and a Turkish tribunal established at that place,* which in G. de Lisle's French map of 1707 is marked as belonging to the Turks. This brings the evidence of the Turkish and Egyptian claims on the west coast of the Red Sea down to the date of the latest transaction bearing on this question. In September 1884, Admiral Sir W. Hewett negotiated a treaty with the Negus (king) of Abyssinia, whereby, in consideration of the restoration to the Negus of the country called Bogos, and the buildings and stores therein, now belonging to the Khedive, the Negus declares there shall be free transit through Massowah, to and from Abyssinia, for all goods under British protection.

With regard to the east coast, much need not be said. Turkish authority, as it has existed from the time of its first supremacy in Arabia, has not been called in question. The Sultan's rights as Caliph are admitted by the natives, and he holds the ports on the coast in the provinces of Hedjaz and Tehamah down to the strait of Bab-el-Mandeb, including the cape of that name. The southern tribes in the province of Yemen outside the strait do not admit his supremacy; and when, in 1872, he was disposed to assert it, advancing in the direction of Aden, the English Government objected, on the ground that all the tribes in that neighbourhood were in alliance with Great Britain and under its protection. Turkey did not advance further, but at the present day it maintains a garrison at, or near, Sheikh Syed, at the extreme southern end of the east coast, where a French company bought an extensive tract of land in 1868.

Reverting now to the time when the attention of the nations of Western Europe was first drawn to these parts by the anticipated opening up of the overland route to India, via Alexandria, Cairo, Suez, and the Red Sea, it appears that England, which had by far the largest stake in the new route, lost no time in seeking and acquiring a suitable port near the entrance of the Red Sea, where she could establish a coal depôt, and provide for the refitting and victualling of her shipping.

Before entering upon this part of the subject it may be desirable to give some idea of the extent of the area and population of the territories which have been under examination, with those of their immediate neighbours. The following figures are taken from the latest volume

* 'Journal of the Royal Geographical Society,' 1869, pp. 190, 214.

of the 'Géographie Universelle' by Reclus. They can, of course, only be approximate. Those of Somali-land are not given.

	Area. Square miles.		Population.		Inhabitants to the square mile.
Abyssinia—Tigré, Amhara, Gojam, &c.	77,220	..	2,000,000	..	26
Shoa	15,440	..	1,500,000	..	89
Country of the Bogos, Mensa, Beni-Amer, &c.	27,030	..	100,000	..	3·6
Massowah and Shoho country	9,650	..	50,000	..	5·2
Country of the Afar, Obock, and Assab	38,610	..	200,000	..	5·1
Country of the Issa (Eesa), &c. ..	5,800	..	60,000	..	10·3
Harrar and neighbouring countries ..	7,720	..	1,200,000	..	155
Galla States of Southern Ethiopia ..	61,760	..	3,500,000	..	56
Total	243,230	..	8,610,000	..	35

The difference in the density, and presumably in the character and habits, of the population on the low grounds upon the shore of the Red Sea, as shown in the above statement, is very marked. Munzinger states that in these parts there is no village of more than twenty houses, and that between the settlements there are many miles of desert.

Aden.—The experience of centuries pointed to Aden, on the southern coast of Arabia, in the native province of Yemen, 95 miles from the Straits of Bab-el-Mandeb, as the fittest place for the required purposes.

In early ages it had been a place of great commercial importance, with a large population. But after the discovery of the route to India by the Cape of Good Hope, it had rapidly declined, and fallen into decay. In 1539 it was captured by the Turks under Suleiman Pasha, who then extended their dominion over the whole province of Yemen. In 1630, however, they were expelled, and the native Arab chiefs resumed possession of the town and province.

The ruler, or Sultan, of Aden was the Sheikh of Lahej, with whom negotiations were commenced by the Indian Government in 1831. It was not, however, until February 1839, that, a treaty having been concluded with him, and subsequent difficulties having arisen, the town was attacked by the English, and taken by force. Treaties were subsequently entered into with the Sheikh, by which England annexed the town and harbour of Aden, with a limited rayon of 35 square miles, 15 miles in circumference, and from three to five miles in diameter, and the Sheikh became a pensioner of the Indian Government. In 1868 the promontory of Jebel Hasan, or Ihsan (or Little Aden), on the opposite side of the harbour, was purchased from the chief of the Akrahis.

Aden under British rule has recovered its ancient greatness. Its population is stated to have been 37,000 in the 16th century. It then successfully resisted the Turks, and also the Portuguese under the celebrated Albuquerque. After two centuries of native occupation, deprived of the European commerce which had formerly created and

maintained it, the following quotation from M'Culloch gives a description of it at the time of its annexation by England:—"About 100 houses, with some wretched huts and three or four minarets, the mosques belonging to which have fallen, are the only buildings remaining to Aden; the rest of its area is occupied by heaps of rubbish, tombs, mounds, and the roofless walls of older dwellings." Its population did not then probably exceed 800, of whom more than a third were Jews and low caste Indians. Its population now exceeds 35,000, and the value of the import and export trade in the year 1882-3 amounted to 3,482,170*l*.

The following is the value of the trade of Aden with the coasts of Africa and Arabia in the previous year, 1881-2:—

	Imports.		Exports.		Total.
	£		£		£
Abyssinia	24,567	..	63,036	..	87,603
East coast of Africa ..	193,683	..	186,849	..	380,532
Arabia	333,793	..	302,636	..	636,429

Aden was declared a free port in 1850. It is attached to the Presidency of Bombay. The neighbouring tribes extending over a considerable area are in alliance with England and under British protection, for which reason England has opposed any interference of the Turks with them.

Tajura.—In 1840, Captain Moresby, R.N., acting on behalf of the Indian Government, entered into negotiation with the Sultan of Tajura, a local chief on the northern shore of the bay of that name, which lies on the African coast, at a short distance outside of the Straits of Bab-el-Mandeb, and concluded with him a treaty, dated 19th August, 1840.

This treaty was one simply of peace, commerce, and protection, but by the 4th Article the Sultan bound himself "not to enter into any other treaty or bond with any other European nation or persons, without in the first instance bringing the subject to the notice of the Government authorities at Aden, so that the same may in no way prove detrimental to his friends the English, or their commerce."

Island of Musha.*—In the same treaty the Sultan confirmed the sale to the Indian Government of the Island of Musha, which lies at the entrance of the Bay of Tajura, and commands its approaches. This island is situated in N. lat. 11° 40' and E. long. 43° 12'. It is 18 miles from Ras-el-Bir, which is the extreme point at the northern entrance of the bay, and six miles from the corresponding point on the southern side of the bay. It was unoccupied when purchased, and has continued so. The Government took formal possession of it in 1858.

Island of Efat or Ivat.†—In the same year, by an agreement dated

* Called in the Treaty *Mussa*.

† Called in the Treaty *Aubad*.

3rd September, Captain Moresby purchased from the Governor of Zeila the Island of Aubad, or Efat, or Ivat, which lies eight miles north of the Port of Zeila, on the Somali coast, and 27 miles south-east of Musha Island. Its position is $11^{\circ} 30'$ N. lat. and $43^{\circ} 28'$ E. long. It was, and continues to be, unoccupied. This and Musha Island are said to be valuable for their guano deposits.

Edd, or Ayth (Eid).—In 1840 MM. Combes and Tamissier, on behalf of a Nanto-Bordelaise Company, bought from certain native chiefs the port and territory of Edd, or Ayth, which lies on the Dankali (west) coast of the Red Sea in 14° N. lat., about 140 miles from the southern entrance of the Red Sea, and 90 miles south of Massowah.

Part of the purchase money was paid, but a dispute arose among the local chiefs as to the right of the vendors to sell the land, and the purchase was not completed. The company having failed, transferred it to the French Consul at Massowah. In 1850 he offered it to the British Government, apparently in a private capacity, after he had ceased to hold office, and described it as a province, 90 miles in length. The Government "did not think it necessary to take any notice of the proposal." * He subsequently, in 1857, sold it to a French company of Marseilles and Alexandria, from whom the Egyptian Government bought it in 1867. The Turkish flag was planted there in 1862, and since 1867 the place has remained in the undisputed possession of the Egyptian Government. It has no recommendation as a port or a trading place.

The scheme of constructing the Suez Canal, and its commencement in 1858, gave a new impetus to the acquisition of territory in the Red Sea and on its approaches.

Island of Perim.—In 1857 England, unwilling that Perim should fall into the hands of any other nation, and possibly become a danger to British commerce passing through the Red Sea, took permanent possession of that island, lying close to the coast of Bab-el-Mandeb, at the entrance of that sea, and then unoccupied. She had previously twice occupied it temporarily in the years 1799 and 1801. The area of the island is about seven square miles, and it now contains 150 inhabitants. The passage between it and the Arabian shore is not more than $1\frac{1}{2}$ to $1\frac{1}{2}$ miles. On the Egyptian side it is 10 to 11 miles from the shore. It is 95 miles distant from Aden, and is under the control of the Government of that place. It is fortified, and possesses a small garrison. A light-house has been established on the highest point on the east side of the island since 1861.

Island of Kamaran.—In 1858, the English Government having decided that it would be inconvenient to establish a station connected with the line of submarine telegraph cable to Bombay on any part of either of the shores of the Red Sea, took possession for that purpose of the island of Kamaran, in N. lat. $15^{\circ} 20'$, about 180 miles north

* Correspondence, Abyssinia, 1862, pp. 44 and 58.

Perim. This island was temporarily occupied by Albuquerque after his unsuccessful attack on Aden in 1513, but had not since been occupied. It is about 12 miles long and from two to four broad. The northern part is swamp and jungle; the remainder is rock and sand, with a few patches fit for cultivation. The population consists of poor fishermen occupying seven small villages containing a few miserable huts.

Up to the past year England did not acquire, or seek to possess, any further territory within, or near, the Red Sea. It will be seen that her object was not to acquire dominion, or to interfere with other nations, in these parts, but to provide a coal depôt, and protection for her commerce and telegraphic communication.

France, which was the only other country of western Europe having a material interest in the commerce of the Red Sea, was not idle on her part. In 1839 Louis Philippe sent a scientific expedition into Abyssinia under Lieut. Lefebvre, who, after a stay of five years in the country, made a voluminous report on it in 1845. In 1849 the French Consul at Massowah, M. Rolland, wrote to his Government on the 7th November: "Tôt ou tard, on doit l'espérer, il se construira un canal à Suez, et alors sans contredit la Mer Rouge sera un des points du monde les plus importants. Dans cette prévision, vous voudrez à coup sûr, M. le Ministre, y assurer à notre pays un établissement commercial et politique convenablement situé." The scientific commission of 1839 had made its report, and the French Government was doubtless fully impressed with the importance of the measure recommended, but was too much engaged with home and European affairs immediately to attend to it.

Island of Dessi (Diseï); Adulis; Zulla (Zula).—In 1859 it charged M. de Roussel to negotiate a treaty with Negussie, the rebel chief of the Abyssinian province of Tigré. M. de Roussel was much struck with the importance of the Island of Dessi at the entrance of the Bay of Adulis, or (as since called) Annesley Bay, and through the influence of M. Jacobis, a Catholic missionary in Abyssinia, obtained from Negussie the offer of both Dessi and Zulla, as well as of Arkiko. The Porte objected, on the ground of its ancient territorial rights, extending, as it alleged, to the Straits of Bab-el-Mandeb; and although M. Gilbert, the French Consul at Massowah, is reported to have obtained the consent of the Hazerta chiefs, to whom Dessi was supposed to belong, it does not appear that the French Government took steps to establish its authority at any of the places, or to annex the territory.* Arkiko had been under the Turkish Government since the 16th century; and in 1862 the Porte took steps to manifest its authority at Dessi and Adulis by hoisting its flag at both places. In 1867, when England was preparing its expedition against the Abyssinian emperor Theodore, she applied to the Porte, and received

* It is stated in *L'Exploration* of 11th October, 1884, that to counteract the French, the English in October 1861 annexed the archipelago of Dahlak lying outside Dessi, and commanding it and Adulis, but there is no trace of such occupation.

its permission to cross, and for a time occupy, its territory at Annesley Bay.

Obock (Obokh).—The French sometimes write this Hobok, on the ground that the Arabs aspirate the initial vowel. In 1859 M. H. Lambert, the French Consul at Aden, visited the west coast, with the view of selecting a fit site for a French establishment, and is said to have selected and purchased Obock. M. Lambert, however, lost his life in the same year, by accidental drowning on the Somali coast, when crossing in a native boat from Hodeida to Tajura, as affirmed by Dr. Beke, or by assassination, as reported by his rival and successor, Sheikh Shermacki, to the French, who sent the corvette *La Somme* towards the end of 1860 to Zeila, to investigate the matter, and to demand compensation. Eventually the Porte consented to make over to the French Government the revenues of that port until the sum of 30,000 dollars, the estimated cost of the mission of the *La Somme*, should be paid.

In April 1862 the French aviso *Le Curieux* visited the Red Sea, with M. Schaefer, first Oriental Interpreter to the Emperor, on board, who, after carefully surveying all the Dankali coast from Massowah to Zeila, selected as a site for a French settlement Obock, on the northern side of the Bay of Tajura, and purchased it of the native Governors of Tajura and Roheita, or of one of them, for the sum of 10,000 dollars, taking formal possession of it in the name of the Emperor Napoleon.

There is no evidence to show within whose territory Obock was situate. Tajura is 27 miles further within the bay of that name. Roheita is on the Dankali coast, in lat. $12^{\circ} 46' N.$, 50 miles in a direct line from Obock.

That place is, or was, a village of a few huts, six miles from Ras-el-Bir, the extreme point at the northern entrance of the Bay of Tajura, which lies at a distance of 37 miles outside the Straits of Bab-el-Mandeb. M. Goltdammer, writing in 1877, after his return from a stay of some months at the place, states that "Obock is a village of little importance, containing a few dwellings. The territory is insignificant in extent. One finds there palm-trees and the flora of equatorial Africa. In the environs are found limestone, potters' clay, red ochre, and sulphur." Elsewhere it is stated that coal is to be found in the neighbourhood.*

According to the latest accounts the limits of the new colony are considerably extended. M. Denis de Rivoyre described them in 1880 as containing an area of 25 kil., or less than 10 square miles. In May last they are stated to have been fixed at 100 kil. or 62 miles of coast, and 38 kil. or 24 miles in depth, containing about 1470 square miles.†

The exact position of the proposed port is N. lat. $11^{\circ} 57'$ and E. long. $43^{\circ} 15'$. It is under six miles from Ras Bir, 16 miles from the British island of Musha, at the entrance of the bay, 58 miles from Perim at the entrance of the Red Sea, and 115 miles from Aden.

* *L'Exploration*, 11th October, 1884.

† Id., 18th October.

The harbour was surveyed by Lieut. Salmon in the French steam aviso *Surcouf* in 1864. It is moderately sheltered by low cliffs on the north, and by the low ground on the west; but it is exposed to the south and south-west, from which quarters the wind blows fiercely at times, rendering the anchorage very dangerous. Further details are supplied in the plan on the map annexed to this paper. It appears to share the common want of all places on these shores, viz. a good supply of drinkable water. The commandant has sent home for distilling apparatus, and a plan has been contemplated of obtaining water from a distant river by means of a canal.

The survey was published in 1865, but the French Government took no further action for several years. Private enterprise was not altogether inactive, but met with little success. In 1872 Mr. P. Arnoux, a French merchant, formed a company to trade with the interior, but after a few months he was assassinated. In 1880 applications were made to the French Government for concessions within this territory, upon which the following official notice was published on the 25th December of that year.

“Des demandes de concession de territoire de Hobok, Mer Rouge, étant fréquemment adressées au Département de la Marine et des Colonies, nous croyons utile de faire connaître au public le sens des réponses invariablement faites à toute ouverture de ce genre. Le Traité de Mars 1862 portant cession de ce point à la France ne contient aucune indication sur le périmètre de notre possession, et de plus nous n'avons rien fait jusqu'ici pour assurer notre souveraineté sur cette contrée.

“Il serait donc impossible d'indiquer le sol susceptible d'être cédé, et moins encore de le délimiter. Dans ces conditions le Département de la Marine ne saurait faire des concessions. Il ne peut que laisser aux personnes qui tenteraient de former un établissement à Hobok toute responsabilité de choix de l'emplacement à occuper par elles, sous la réserve que cette occupation essentiellement précaire et révocable devra cesser à la première requisition. Il est bien entendu d'ailleurs qu'aucune indemnité ne sera due aux intéressés en cas de déplacement pour cause d'utilité publique ou d'intérêt militaire.” *

In January 1882 M. Paul Soleillet arrived at Obock from Senegal, and soon after opened up the road to Shoa, where he is said to have obtained important concessions from King Menelik, the ruler of that country. These were—(1) an extensive tract of arable land in Shoa; (2) the right of grafting the wild olive trees in the country; (3) the right to construct a horse tramway between Hobok and Fared (not marked on any map) and the cession of any other railroads to be made in the country.†

In August 1882 M. Soleillet obtained from Sultan Mohammed Loita a concession of the so-called port and roadstead of Sagallo, near the head of the bay, 11 miles beyond the town of Tajura, and 37 miles from

* *L'Exploration*, 1881, vol. ii. p. 716.

† *Id.*, 11th October, 1884.

Obock.* This place lies on the road by which caravans pass from Shoa to its chief place of export at Tajura, and is therefore that much nearer to Ankober than Obock. Doubtless goods could be conveniently conveyed between the two places by boats, but at the cost of transhipment.

Having achieved these important results, M. Soleillet went to Paris, with a letter from King Menelik to the President of the Republic, and the Government appear to have been convinced of the value of the new settlement, and of the expediency of creating it with public funds.

In December 1883 they contracted with a French steam navigation company to establish a regular packet service to the Persian Gulf, touching and coaling at Obock, on the understanding that they would form an establishment there for refitting French vessels. A dépôt of coals had been formed there in April 1884. Three thousand tons of coal are said to have been deposited, and three military transports to have been supplied, up to a date not named.

On 22nd May, 1884, a caravan which left Obock on the 23rd March reached Shoa.

In the same month the limits of the colony were defined, as above described.

M. Bremond, the chief of the expedition sent to Shoa by the Society of French Factories, states that the king, Menelik, dreams of seeing his country traversed by railroads, uniting his capital, Ankober, with the utmost parts of his dominions, and of the establishment of a regular service of steamers on the river Hawash down to the Lake Aussa, into which it runs. He has allowed one engineer, M. Henon, to explore that river. He also employs a French doctor; has built him a house, and given him land on which to cultivate cinchona. He purposes to build a hospital, in which a certain number of young Abyssinians may be taught surgery. A mining engineer, M. Aubrey, is about to explore the country of the Gallas and Tigré.

Among other symptoms of advancing civilisation in Shoa, it is mentioned that M. de Soleillet, finding that King Menelik corresponded with Queen Victoria in English and with King Humbert in Italian, represented to him that French was the only authorised language among civilised nations, and that if he wished not to be considered a barbarian, he should adopt it, which the king has done, and M. de Soleillet was about to take out a printing press and materials.

In June 1884, M. Lagarde was appointed Commandant of the establishment. He has been active, especially in the matter of annexation, but his proceedings in laying a tax on native shipping frequenting the port have provoked animadversion and discontent.

In July the Government obtained a credit of 82,000 fr. (3280*l.*) for the second half of the year towards the erection of a fort, dépôts, warehouses, and tanks, and the payment of the expenses of administration.

* *L'Exploration*, 11th October, 1884.

A lighthouse, and a landing-place on piles, 1140 feet in length, are also mentioned as works in contemplation.

In November last it was reported from Aden that on the 18th October Sagallo, ceded by special treaty to France, upon being evacuated by the Egyptian troops, had been occupied by a detachment of French marines, and a post established above Tajura at Ras Ali.

On the 19th and 21st October the French flag was hoisted on territory ceded by the Sultan of Tajura, and M. Lagarde having visited all the coast and organised the new ports, returned to Obock, accompanied by the two sultans, of Tajura and Sagallo, who would not leave him. The former expressed a wish to visit France.

In the next month it was reported that the French man-of-war the *Seigneley* had planted the French flag at Sagallo, and had done the same at Tajura as soon as the Egyptian troops retired from it.

The above statements, which seem to offer bright prospects for the new port, and which inspire the editor to call it the "Singapore" of Africa, are taken from *L'Exploration*, written in sympathy with, if not under the inspiration of, M. Denis de Rivoyre, one of the promoters and warm advocates of the port. But the picture has a reverse. In one of the recent numbers of that journal appears a letter from a correspondent at Aden, discussed and contradicted by the editor and M. de Rivoyre, in which, referring to a recent visit, he writes in the following terms: "Obock n'est, à vrai dire, qu'une plage sablonneuse, à un kilomètre de laquelle s'élèvent quelques plateaux, au bas desquels les indigènes ont construit des huttes en roseaux. Le port offre certainement quelques avantages, mais que sont ces avantages à côté des inconvénients que présente le débarquement sur une plage mouvante et découverte pendant les basses marées?" Another correspondent complains of a want of water, cattle, vegetables, and even conveniences for coaling. All this is to be expected in a port which has been officially occupied but half a year. It has been proposed to bring water by a canal from the river Hawash; but that river runs into a brackish lake, called Lake Abhebad, at a distance of 65 miles from Tajura, and the stream issuing from that lake terminates 36 miles from Tajura. Cattle may be brought from Somaliland. With a supply of water, vegetables may be grown. But the real difficulties of Obock are, first, the situation and character of its harbour, which may be seen in the plan attached to this paper; secondly, its distance—of 50 or 60 miles—out of the route of vessels bound via the Red Sea to and from India and the East; and thirdly, the improbability of the export trade of the interior of this part of Africa contributing sufficiently within many years to the maintenance of an artificial harbour, and an expensive Government establishment.

Assab (Asab).—This bay, situate in N. lat. 13°, 45 miles from Perim, with all the islands lying within it, and the coast-line, for a depth varying from two to six miles, from Ras Darmah, the eastern point

of the Bay of Beilul, in N. lat. $13^{\circ} 14'$, to Ras Sintiyar, the south-east point of the Bay of Assab, in N. lat. $12^{\circ} 53'$, which had been purchased by Prof. Sapeto, the representative of MM. Rubattino & Co., of Genoa, with all rights both of possession and sovereignty, was bought from that company, and formally annexed by the Italian Government in the year 1882. The history of the purchase, or rather of the successive purchases, made by Prof. Sapeto, is very fully set forth in a Report made to the Italian Parliament, and subsequently published, in that year, and deserves a detailed notice.

In October 1869 the Chamber of Commerce at Genoa represented to the Italian Government the expediency, with reference to the opening of the Suez Canal, of establishing an Italian agency in the Red Sea, possibly near Sekeira (Sheikh Syed), for the convenience of Italian shipping. This place, and Khur-Omera (Khor Umairah), a small bay about seven miles east of Bab-el-Mandeb, were rejected, as interfering with other Powers. Signor Rubattino, then, with the approval of the Italian Government, employed Prof. Sapeto, who had a thorough acquaintance with the Dankali and Somali tribes, acquired during a long stay among them, to select a suitable site for an establishment, who, after rejecting the Bay of Ras Dumairah, near Roheita, fixed upon Assab, "belonging to an independent tribe of Danakil." The several treaties which he concluded with the local rulers on that coast are given at length in the Italian Report.

On the 15th November of the same year, 1869, he purchased from the brothers Hassan-ben-Ahmad and Ibrahim-ben-Ahmad, for the sum of 6000 thalers, "the territory comprised between the mountain Ganga (shown on the small plan of Assab Bay annexed to this paper), Cape Lumah, and their two sides," with sovereign rights over it.

On the 11th March, 1870, Prof. Sapeto and Captain Buzzolino, as representatives of MM. R. Rubattino & Co., purchased from the Sultan Abdallah Shiahim and the Sultans Hassan-ben-Ahmad and Ibrahim-ben-Ahmad (the two latter being the contracting parties in the former treaty), for 8,100 Maria Theresa thalers, "the tract of country and of sea extending between Ras Lumah and the inlet called Alala and the mountain Ganga," with absolute sovereignty over it. By virtue of this treaty the Italian flag was first hoisted on the west coast of the Red Sea on the 13th March, 1870.

Nearly ten years later, on the 30th December, 1879, Prof. Sapeto, on account of MM. Rubattino, concluded a treaty with Berehan-Dini, Sultan of Roheita, for the purchase of "the Islands of Omm-el-Bachar, Ras-er-Raml, and the Darmackié group," all islands nearest to the coast acquired by the preceding treaty, for the sum of 2000 rupees, and a further sum of 1000 thalers as the rent of them during the previous ten years, in accordance with an agreement made between the same parties on the 16th March, 1870, for the lease of those islands.

It is mentioned, in a note to this treaty, that the Sultan of Roheita

at that date was ready to sell these islands for 6000 thalers, on the condition that the purchaser would protect him from any attack of the Turks by sea (showing evidently that he anticipated the opposition and resentment of the Turks), but Prof. Sapeto being unable to ensure him this immunity, arranged for leasing the islands for ten years at the rate which he afterwards paid to the Sultan.

On the 15th of the following March, 1880, Prof. Sapeto bought from the same Sultan, then signing himself Berehan-ben-Mohammed, and styling himself "sovereign, absolute master and proprietor of the territory in the neighbourhood of the country of Assab, now Italian property, by force of a traditional and uncontested right," "all the islands without exception lying in the great Bay of Assab and between the parallels of Ras Sintiyar and Ras Lumah (N. lat. $13^{\circ} 2'$), together with all the shore extending between the said capes, and a tract of the mainland, forming a belt of two marine miles inland from high-water mark all along the coast from the Bay of Buya to Sheikh Duran, and a similar belt of four marine miles along the coast from Sheikh Duran to Ras Sintiyar," with full possession and sovereign rights over the whole.

Lastly, on the 15th May, 1880, Prof. Sapeto made a similar purchase for 1500 thalers, from Hassan, Ibrahim, and Raghe-ben-Ahmed, the two former being the contracting parties in the first two treaties, of the Island of Sannabor (N. lat. $13^{\circ} 5'$) and the mainland extending between Ras Darmah (N. lat. $13^{\circ} 14'$) and Ras Lumah to the depth of six marine miles from high water.

Italy has thus acquired such proprietary and sovereign rights as these local chiefs, signing themselves sultans, had the power to convey, of the coast, and a belt of land along the shore, varying from two to six miles in depth from Ras Darmah to Ras Sintiyar, a distance along the coast of about 35 miles. The latter cape is 10 miles from Roheita, the abode of the Sultan of that name.

Between 1870 and 1879 an expedition from the Geographical Society of Italy, including the Marquis Antinori, MM. Beccari and Issel, visited and reported favourably on these ports. In September 1870 MM. Rubattino started a line of monthly packets between Italy and Bombay. In 1873 the Italian Parliament voted a subsidy in aid of this line running its vessels to Bombay and Calcutta. A Royal Commission in 1876 recommended the establishment of another line of packets from Genoa to Singapore and China. In 1876, Italian shipping passed through the Suez Canal to the extent of 82,024 tons. Between 1873 and 1877 much discussion arose in the Italian Parliament as to the use to be made of Assab. It was admitted that it was not fit for an agricultural colony, on account of the nature of the soil, nor for a penitentiary establishment for various political and other reasons, but that it was exclusively and admirably adapted for a commercial station.

In 1879 Prof. Sapeto, in his book on 'Assab and its Critics,' and the
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Geographical Society of Italy, replying to inquiries from the Government, pointed out that the port, if established, lying within seven hours from Mokha, and 15 from Hodeida, on the Arabian shore, and being in a central position as regards the export trade of Abyssinia and Shoa, would attract the trade alike from Massowah and Suakin on the north, and from Zeila on the south.

In the same year the geographical expedition of Martini and Giuglietti was despatched to Shoa, and in September the Italian Government despatched Commandant de Amezaga to examine and report on the maritime fitness of Assab Bay. In 1880 it appointed Signor Bianchi Consul for the Red Sea and Commissary Civil at Assab, with instructions to ascertain the prospects which that place offered of becoming a convenient port and depôt for the trades of Abyssinia and Arabia.

Meanwhile, as soon as it became apparent in 1880 that the Rubattino Company was about to take renewed action at Assab, the Egyptian Government interfered, claiming sovereign rights over the coast in question, by virtue of the cession made to it by the Porte in 1866. In 1871 a correspondence had commenced between the Egyptian and Italian Governments on the same subject, but it was dropped, as the Rubattino Company seemed unwilling at that time to carry out their plan.

The views of Her Majesty's Government are expressed in a despatch from Earl Granville to Sir A. Paget, dated 8th June, 1880, in which his Lordship says, that to a representation of the Italian ambassador he had answered, "We considered that the Egyptian Government held the sovereignty of the country, of which the bay formed part, and that we protested against the exercise, or assertion, of any right of sovereignty on the part of Italy." *

A long diplomatic correspondence ensued, in which the contradictory evidence of the Italian and Egyptian Governments was laid before Her Majesty's Government, and the Italian Government urged upon the latter the sufficiency of the assurances given in the instructions to the Commissioner at Assab, to the effect, that they have not the intention of founding at that place anything resembling a military establishment, or an establishment destined for the use of the Italian Navy; that they will never make use of Assab to found there a convict establishment; that "it is necessary, finally, to let all the world know that Assab, in our hands, is not, and never will, become a rallying point for any action which has for its object injury, or menace, to the possessions of Her Britannic Majesty." †

In the end, in June 1882, Signor Mancini laid before the Italian Parliament a draft of a law for taking over the Rubattino purchases, and the works and improvements executed on them up to date, for the sum of 416,000 lire (16,640*l.*), annexing the territory, and making a grant of 60,000 lire (2400*l.*) towards the expenses to be incurred during the

* *Parl. Papers*, 1882, Correspondence, Assab, p. 13.

† *Ibid.*

remainder of that year in commencing the organisation of the colony, and carrying on the works commenced in it, which sum was raised to 109,112 lire in the next year. Correspondence on the subject of the Minister's statements upon introducing this draft concludes the latest papers laid before Parliament in 1882.

Since then the correspondence has not ceased, and little progress has been made in developing the new establishment. In April or May 1881, Signor Giuglietti, the Secretary to Signor Bianchi at Assab, was killed by the natives, with twelve companions, at a distance of four days' journey from Beilul, while attempting to penetrate into the interior of Abyssinia. On the other hand, Count Antonelli was successful in reaching Ankober, the capital of Shoa, and establishing friendly relations between King Menelik and the Italian Government.

Signor Bianchi complained, in a letter from Assab, written two years ago, that Italian merchants were not giving much support to the place. In the first quarter of the year 1883 the entries inwards were 84 native sambuks of 1210 tons, and those outwards were 85 sambuks, of 1217 tons.

The population of the settlement at the close of 1881, exclusive of 266 sailors on board the boats in the harbour, was 917, distributed over five villages, viz. Buya 177, Assab 100, Maacaca 140, Atali 250, and Margableh 250.

The latest news is very deplorable. Signor Bianchi, the intrepid traveller and intelligent officer of the Italian Government, has been murdered, with two companions, on his return journey from Abyssinia, within a day's march of the frontier of that kingdom. The expedition had been undertaken for the purpose of obtaining the liberation of Captain Cecchi from the Queen of Gherra, in which he had succeeded; and his murder is an additional evidence of the difficulties and dangers attending the attempt to open up the interior of this country; for he had already four times successfully traversed the country between Massowah and the Gallas across Abyssinia. From Rome it is reported that the Italian Government is about to despatch without delay a strong military force, of several hundred men, to the coast, with what specific object, and with what hopes of attaining it, does not appear. The result of their efforts to obtain justice in the case of Giuglietti was most discouraging.

The same letter which brings this melancholy news from Assab contains a very unfavourable report of the appearance and character of that place. It is written by the Alpine traveller, M. Frasca, who went out from Genoa accredited by the Society of Commercial Exploration in that city, and accompanied by the Alpine guides, the two brothers Carrel, who made the ascent of Chimborazo with Whymper. He writes on 17th November to a merchant in Genoa:—

“Excellent ami,—Je vous écris de cette colonie, sur ce coin de terre aride, brûlante, qui n'a jusqu'à présent ni importance commerciale, ni

végétation, ni aucune route pour pouvoir ouvrir un trafic quelconque avec l'intérieur."

There is much testimony to the same effect. It would therefore appear that the commercial prospects of Assab are on a par with those of Obock. Assab has the advantage of being on the direct line of the route to India; while Obock possesses that of being at the end of one of the old-established lines of caravan route from the interior to the coast. But the existence of the two ports in such close proximity to one another must be mutually prejudicial, not only as regards the inadequacy of the trade to supply business to both, but, which is more important, as creating a rivalry in the markets of the interior, which is likely to diminish the profits of business, and to lead to dangerous consequences in dealings with the wild tribes frequenting them.

Sheikh Syed.—This is neither a port, as it has been sometimes incorrectly called, nor an inlet from the sea, as it is represented in many maps. The only anchorage in this neighbourhood is an open roadstead to the south-by-east of Ras Sheikh Syed, extending for about $1\frac{1}{2}$ mile from that point to Sheikh Malu, or Oyster Island, which is at the foot of Cape Bab-el-Mandeb. The apparent inlet is a large lagoon, about $1\frac{3}{4}$ miles to the north-east of Ras Sheikh Syed, about two miles in length and about half a mile in width at the middle, said to cover 3000 hectares (7400 acres), and with water in the centre from one to four feet. It communicates with the sea by a narrow channel a few yards wide, and the mouth, facing westward, is almost closed by two banks, which dry at low water.

The territory of Sheikh Syed, which has attracted some public attention of late years, is a tract lying between the lagoon and Cape Bab-el-Mandeb, and said to include both, and to contain 165,000 hectares (400,000 acres). It was purchased in October 1868 for a Marseilles firm, now represented by MM. A. Rabaud-Bazin, from the Sheikh Ali-Tabatt-Dourem, at the price of 50,000 francs (2000*l.*). It was anticipated that an admirable harbour might be constructed on the site of the lagoon. The place was surveyed and plans were prepared. It was proposed to deepen the lagoon, to unite it with the sea by a canal $1\frac{1}{4}$ mile long, and to run out a breakwater 3300 feet into eight fathoms water, giving a depth alongside of 13 to 36 feet. The tides are said to be regular. Fresh water was procurable only at a considerable distance.

In 1870 the French Government established a small coal dépôt here, half-way between the two capes, for the use of their transports, and a two-storied building, marked as a barrack in the Admiralty chart, was erected. A military guard was maintained at the time. But the whole was abandoned after a short occupation, and there is at present no sign of a hut or of an inhabitant in the whole territory.

MM. Rabaud have since pressed the French Government to take over the purchase and annex the territory; and lately rumours have

been spread of negotiations with a German and a Russian company. But there is one sufficient reason why no government is likely to purchase the territory. It lies in that part of the province of Yemen which was reconquered by the Egyptian forces in the present century, and in which Turkish authority has been re-established, and Turkish troops are maintained at the present time. It is not likely to tempt any private company, as it possesses no natural advantages of any kind, and the construction of an artificial harbour would be very costly, and could not possibly prove remunerative, considering that Perim harbour is close at hand as a port of refuge, and that a harbour here would have to compete with the long-established ports of Aden and Mokha on each side, and with the new ports of Obock and Assab, all of them within less than a hundred miles of it, while this part of Arabia offers no export trade of any description.

The great advantage of the position, as represented by *L'Exploration*, is, that the heights on the mainland would entirely command Perim Island, which is only $1\frac{1}{2}$ mile distant.

Somali-Land.—Haggenmacher, in the account of his journey in Somali-land in 1874,* states that the Portuguese on their first journey to Abyssinia under Ch. de Gama found the coast-line between Tajura and Cape Guardafui a powerful kingdom called Adel, ruled by Mahomedan princes, and conspicuous enemies of Christendom. This kingdom is marked in the old maps as Adâl, or Zeila. Their hostility to the Abyssinians, and the ruin which they carried into that country have already been narrated. There is therefore some ground for the assumption of authority claimed by the Sultan as Caliph, if not as Sovereign, on this coast, and which the Egyptian Government asserts had been transferred to it by the Firmans of 1866 and 1875, and had been admitted by the English and French Governments,† as far as Ras Hafun, 90 miles south of Cape Guardafui, when they some years ago contemplated the erection of a lighthouse on that site, and also by the English Government in the Convention of September 1877.‡

As far as the records go, the British Government entered into two treaties§ with the Somali tribe occupying this coast, at Berbera and the neighbourhood, in the years 1827 and 1855; and it has already been mentioned that in 1871 the Egyptian flag was hoisted in six places on it, extending from Berbera to Ras Hafun, and at Bulhar, between Berbera and Zeila, constituting thus an assumption of authority along the whole coast.

Berbera (Berbereh).—In 1873 Berbera was occupied by Egyptian troops. In 1875 the port was closed by the Khedive, but reopened in the

* Published in Petermann's 'Mittheilungen,' 1876.

† Correspondence, Abyssinia, 1862, p. 61.

‡ Ibid., p. 60.

§ Hertslet's 'Treaties,' vol. xiii.

following year as a free port. On 24th September, 1884 it was evacuated by the Egyptian troops, when their place was taken by British troops, who now hold it. Berbera has long been one of the chief sources whence the port of Aden has derived its supply of sheep, goats, and cattle, which are bred in large numbers on this coast. In 1881-2 it imported 60,385 sheep and goats and 2477 head of cattle from Somali-land. Berbera is an excellent and capacious harbour, free from all danger, having 11 to 13 fathoms of water at the mouth, which decreases slowly to five fathoms at 400 yards distance from the town. It affords good anchorage, and shelter from all winds but the westward. During the annual fair, or trading season, lasting from October to March, the natives from the surrounding country flock in with their produce to the number of 10,000 to 15,000.

It is 140 miles distant from Aden, and 120 from Zeila.

Berbera is one of the outlets of the trade of Harrar, whence it is distant 286 miles, or, according to Major Hunter's recent experience, 22 days' (156 hours) journey.

Zeila.—This port lies 75 miles outside the Straits of Bab-el-Mandeb, 25 miles south-east of the Bay of Tajura, and 60 miles south-west of Aden. It is the principal port for the trade of Harrar, whence it is distant 182 miles, or 13 days' (83 hours) journey.

Lieut. Cruttenden, R.N., who visited it in 1848, and described it in the 'Journal of the Royal Geographical Society,'* stated that it was under the dominion of the Turkish Shereef of Mokha. In 1875 the Porte transferred it to the Khedive of Egypt, since which time it has continued to be occupied by Egyptian troops. Some British troops were there up to a recent date, but have been withdrawn, after the establishment of a British Consular Agent on the spot. The population in 1848 was about 750; it is now reckoned at 4000. The town lies on a low sandy point, and a vessel of 250 tons cannot approach within a mile of it.

Harrar (Harâr).—According to Major Hunter's recent report upon the Province of Harrar, of which an abstract is published in the present number of the 'Proceedings,' p. 121, this province includes all Egyptian territory outside the straits of Bab-el-Mandeb, extending from the town of Harrar to the coast of Zeila, and onward as far as Ras Hafun, embracing in fact the whole of the territory in Galla and Somali-land, as far as the latter place, over which Egypt assumed authority, by virtue of the Firmans of 1866 and 1875. The province of Harrar proper lies in a circle, with a radius of about 40 miles.

The town of Harrar, which has been called the "Timbuktu" of Eastern Africa, is one of those remarkable places which has maintained within its walls a distinct race, speaking a tongue not understood by its neighbours, for many generations. Its area is about 200 acres; it contains 4500 domiciles; the population within the walls is 30,000, with

* Vol. xix. (1849).

6000 residing in the suburbs, of whom perhaps only one-third are natives. Of the whole number two-thirds are women, and not half a dozen Europeans. It has been the centre of trade for the surrounding country for centuries, despatching caravans to Tajura, Zeila, and Berbera. Burton gives a full account of the town and its inhabitants in his 'First Footsteps in East Africa,' to the accuracy of which Major Hunter bears testimony.

Island of Socotra.—It only remains to mention the treaty made with the Sultan of Socotra on 23rd January, 1876, by which that potentate binds himself, in consideration of a payment of 3000 dollars a year, "never to cede, to sell, to mortgage, or otherwise give for occupation, save to the British Government, the Island of Socotra, or any of its dependencies, the neighbouring islands," which are numerous. It is further stipulated "that the stipend imposes upon the Sultan the obligation of rendering assistance to any vessel, whether belonging to the British or any other nation, that may be wrecked on the island or on its dependencies, the neighbouring islands, and of protecting the crews, the passengers, and the cargo thereof, for which act of friendship a suitable reward will also be given." *

In conclusion, I venture to hope that, whatever imperfections may be found in this attempt to give a sketch of the past history of the occupation of the Red Sea littoral, the information which has been brought together, and the accompanying map and plans will be useful in giving the Fellows of the Royal Geographical Society a clear and impartial view of its outline, and in enabling them to appreciate and form a correct judgment upon passing events in that part of the world.

GEOGRAPHICAL NOTES.

Mr. Arnot's Journey in South-Central Africa.—Mr. F. S. Arnot, whose adventurous journey last year from Natal to Bihé was mentioned in the 'Proceedings' for December last (vol. vi. p. 743), has sent us, through his brother Mr. N. M. Arnot, a sketch-map of the most interesting part of his route, viz. from Shoshong to Bihé. He appears to have crossed the Zambesi a little above the Victoria Falls. Thence he followed the river the whole distance to Lialui, taking from that place a west-north-westerly direction to the great plateau on which Bihé is situated. We hope soon to be able to publish this map, together with extracts from the traveller's journal.

Progress of Major Serpa Pinto's Expedition.—According to the latest news from Mozambique, the Portuguese Central African Expedition had up to the first week in December scarcely made a start for the interior.

* Hertslet's 'Treaties,' vol. xiii.

Serpa Pinto got away from his camp at Moosuril, opposite Mozambique, on the 13th of November, but from the disturbed state of the country west of Meza Mountain, owing to the depredations of a Makua chief and the famine in that district, he had to keep to the east, at no great distance from the sea-coast, and arrived on the 2nd of December at Mjuani on the shores of the fine harbour of Nakala which extends inland from Fernão Veloso Bay. By last accounts he was detained here awaiting further supplies from Mozambique.

Return of M. Giraud.—Our last accounts of the expedition under the command of M. Giraud reported him as awaiting supplies and a fresh recruitment of porters at the Belgian station of Karema. We now hear of the definite failure of his undertaking. After equipping a fresh party at Karema he crossed Lake Tanganyika and started from its western shore for the Upper Congo, to carry out his original design of descending the river to the International settlements. Here his men deserted him and he was compelled to return. With some help from the English and Scotch missionaries on the lake he was enabled to reach the coast at Quillimane, via the "lake junction road," Nyassa, and the Shiré. His deserters after leaving him retained the French flag and Chassepôt rifles, and turned highwaymen on their long journey back to Zanzibar, where they were cast in prison by the French Consul on their arrival.

The Chinese Provinces Sze-chuen, Yun-nan, and Kuei-chou.—A report of a journey through these provinces by Mr. Alex. Hosie, acting consul at Chung-king, has just been published as a Parliamentary Report (China, No. 2, 1884). It contains a surprising amount of detailed information regarding the topography, products, agriculture, manufactures, and trade of the districts traversed.

Expedition into the Interior of Somali-land.—Messrs. F. L. and W. D. James, the well-known travellers in the Eastern Soudan, are now engaged on a fresh journey of exploration, into a region much less known than the scenes of their previous labours. The following letter from one of the brothers gives an account of their preparations for the start:—

BERBERA, December 12th, 1884.

Dear Mr. Coles,—At last, after many delays, we have arrived on the Somali coast, and we hope in a few days to start inland. We were delayed three weeks by one of our party getting ill with typhoid fever; he is getting well again, but we had to leave him behind at Malta. We stayed nearly a fortnight at Aden, and collected seventeen Somalis to act as guard, and we intend arming them with rifles. We have as headman a Somali called Dualla who was for six years with Stanley, and we hope he will prove very useful—he belongs to the Habr Gerhajis. We are now in treaty for camels, which of course is one of our great difficulties as we need so many. We are taking large quantities of cotton cloth, beads, rice, and dates, and they are very heavy carriage. There are several different routes to the Ogaden country, the easiest is from Bulhar as there is more water, but the tribes are unfriendly, and we are strongly advised not to go that way. We intend trying a route through the Habr Gerhajis' country to Lebialii, where Haggermacher went in 1874; after that we

have a desert of five days without water which will be a great difficulty for so large a caravan, it brings us well into Ogaden, and then a few days more takes us to the Webbe Shebeyli, as far as we intend trying to go. It is very difficult getting any reliable information here, every one says something different. Most of the natives speak favourably of our chances, other people think there is great danger, but I think no one really knows, and we shall endeavour to feel our way. Our instruments have arrived safely, and my watch is going capitally, so we hope to do good work. I will write to you again if all goes well and let you know how we are getting on.—Yours, &c., WILLIAM D. JAMES.

The Province of Harrar.—A very valuable contribution towards the exact knowledge of North-eastern Africa has recently been made by Major F. M. Hunter, Officiating Political Resident at Aden (already well known to geographers by his excellent descriptive handbook and account of that Station, as well as his former official reports, and his Somali Grammar), in the form of a report on the Province of Harrar, for a copy of which, with two accompanying maps, we are indebted to the courtesy of that officer. As this is not in narrative form, it is impossible to give any particulars of the actual journey which Major Hunter took, accompanied by Lieutenant J. D. Fullerton, R.E.; but from the general map (scale 1 : 633,600) he appears to have followed the direct route from Zeila to Harrar, with minor excursions westward to Warrabili and Gafra, his return to the coast being made by Warasaya and along the eastern Egyptian boundary to Berbera. Details of the distances (Zeila to Harrar, 182½ miles; Harrar to Berbera, 286 miles), with times, water supply, and general road remarks, are given in an appendix, from which it would seem that travelling is easy for the first 47 miles from Zeila, but difficult for the remainder of the distance (except an almost level sandy plain of 28 miles between Biyo-Kabôba and Kotto), the road running up the stony beds of rivers, over steep saddle-backs, and through ravines, and the country near Balawa, some 20 miles from Harrar, being especially bad. As might be expected, the region most easy for travel, being level and sandy, is the worst as regards water supply. From Harrar to Berbera, as far as Garabassa (some 80 miles), the track (which cannot be called a road) runs through similar rough and mostly rocky and well-watered country; from this point a waterless plain extends for 100 miles in an easterly direction, until the Hirwar river is reached at Dabo-lek, which is in the centre of a thickly wooded country. From thence to Malgod, river beds, stony valleys, and steep ridges are traversed, all more or less well watered; and from Malgod to Berbera in a level sandy plain. It is stated that the above-mentioned waterless tract of 100 miles can be avoided by keeping well to the north; and if this is the case, trade would naturally adopt the route to Berbera in preference of that to Zeila, owing to the superiority of the former as a port. Major Hunter defines the province as including all Egyptian territory beyond the Straits of Bab-el-Mandeb; this is divided into three portions, Harrar proper, the Governats of Berbera and Zeila, and the coast from Rakhuda to Ras Hafûn. Excluding the latter, over which the Khedive's authority is only nominal, the approximate area of Harrar is 23,000 square miles. The province has been recently subdivided into four modiriyahs, Nelay, Abâdde, Nânno, and Jârso-Geri, lying in a radius of 40 miles round the city of Harrar; these, however, only include the cultivated hilly districts, the tracts occupied by the Eesa and Gadabursi Somâli, lying on either side of the road from Zeila, being distinct. The number of these two tribes is estimated at 126,000, which added to the approximate population of the four modiriyahs, 328,770, gives a total of 454,770 for the whole province. It is noted that the report on the Egyptian provinces of the Sûdan, Red Sea, and Equator, published by the Intelligence Department in 1883, gives the total

population of all three at only 130,000. Some changes are noted and corrections made in the Galla tribes lying round Harrar itself, referring to the report just mentioned: e. g. the distinction between cultivators ("Kotto" or "Argatta") and shepherds ("Parintuma") has now almost disappeared, and all are called cultivators. The system of councils of 100 and 300 with presidents has also expired; and robbery as a trade has come to an end, one of the effects of the establishment of a strong government having been the pacification of the warlike section of the Gallas, few now carrying any other arm than a heavy stick. Many of the Abaddo and other clans are now Muslims, and it is considered that probably in a few years all the tribes under Egyptian rule will become followers of the Prophet, in spite of the French Catholic Mission. The city of Harrar and its environs had a population of 36,000, of whom 30,000 resided within the walls. 10,000 of these were natives, the rest being Gallas, Somâli, Abyssinians, Arabs, and the then Egyptian garrison. There are generally only two or three Europeans actually resident, principally Greeks. The city has some 4500 domiciles; two-thirds of the inhabitants are women, and Major Hunter, who gives some details on their material condition, dress, domestic ceremonies, &c., refers generally to the account given by Burton ('First Footsteps in East Africa,' 1856) as absolutely exact, few changes having occurred since his visit. As regards products, Major Hunter gives details of a large number of cereals, &c., raised and used for food, including maize, wheat, oats, gram, jowâri (*Holcus sorghum*, in which the Government dues are partly paid), linseed, lentils, carraway, beans, &c.; many vegetables and fruits are also obtainable, and fodder is plentiful. The reputation hitherto enjoyed by Harrar for the superiority of its breed of horses seems to have no real base. Horses, or rather ponies, are plentiful and hardy, but none are bred specially in Harrar; cattle, sheep, goats, and asses also abound. Whatever special coinage may have prevailed in years past, all traces of it are now gone, and debased Egyptian piastres with Maria Theresa dollars are the only currency, though the rupee is taken, and it is stated that the tribes recognise the English coinage to be of intrinsic value. The only industries are bookbinding and weaving, and the principal indigenous exports are now coffee and wares (the safflower, *Carthamus tinctorius*, much used in Arabia as a dye), hides also being largely brought to the coast. A table is given of the trade of Zeila, Tajura, and Berbera with Aden during the past five years, that of Berbera alone being on the increase. As usual, the great obstacle is the want of speedy, cheap, and safe communication with the coast, and a railway is considered to be impossible unless the province is in the hands of some other power than Turkey or Egypt, though apparently mechanically feasible. At present, only the more valuable descriptions of merchandise can bear the inevitable increase on their value from cost of transit and official exactions. The map accompanying Major Hunter's report already referred to, is apparently the only one existing with any pretension to accuracy; the positions of the various tribes on it are taken from the large Egyptian Survey, the details of which were, however, found to be too incorrect for use. A map is also given of Harrar city and its surroundings (scale 1:2000), copied and corrected from a plan drawn by an Egyptian captain on the Staff of the province, whose drawing is commended as admirable, if the correctness of his reconnaissances is questionable. The city is fairly defensible against native attack, but would be untenable if assaulted with field artillery.

REPORT OF THE EVENING MEETINGS, SESSION 1884-5.

Fourth Meeting, 5th January, 1885.—General Sir J. H. LEFROY, K.C.M.G.,
Vice-President, in the Chair.

PRESENTATIONS.—*Rev. George Heaviside; Rev. Dr. F. A. Walker.*

ELECTIONS.—*Charles Napier Bell, Esq.; Harry Wm. Christmas, Esq.; Major James Gildea; Wyman Jeffries, Esq., M.D.; Dr. Wilhelm Joest; Alfred Rumball, Esq.; Arthur William Walker, Esq.; Rev. William Wright.*

RETURN OF MR. H. H. JOHNSTON.

After the preliminary business was disposed of,

The CHAIRMAN (Sir J. H. LEFROY) said the meeting would be glad to hear that the distinguished African traveller Mr. H. H. Johnston was present. A few days ago he dropped unexpectedly from the clouds of Kilimanjaro. He had accomplished a journey of extreme interest from every point of view, and had resided six months on that mysterious mountain. He had ascended it to a higher elevation than the summit of Mont Blanc, and had brought back many facts of singular interest. It would not be fair to Mr. Johnston to ask him to anticipate the paper which in a fortnight's time he would read before the Society, but he was sure they would all be delighted to hear him make a few remarks.

Mr. H. H. JOHNSTON said it was with very great pleasure that he found himself back again at a meeting of the Royal Geographical Society. It seemed but a very short time since he left England, but he hoped he had not wasted that time in Africa. The only reason why he came back was because he had expended all the means with which he had been supplied. He left the mountain with great regret because the climate and surroundings were very pleasant to him. He found it a very great advantage to follow in the footsteps of Mr. Thomson. There had been some travellers in Africa whom it was no advantage to follow, but in the case of Mr. Thomson it was a positive help, because of the excellent impression that he had left behind among the natives. He (Mr. Johnston) never heard a single complaint with regard to the conduct of Mr. Thomson's expedition; though very few expeditions could traverse so difficult a country without leaving some friction behind. He spent six months on Kilimanjaro, occupying thirteen days in going there, and the same time coming back, starting from Mombasa and returning along the Ruru route to Pangani.

THE ASCENT OF THE NILE CATARACTS BY THE BRITISH EXPEDITION FOR THE
RELIEF OF GENERAL GORDON.

The CHAIRMAN said the meeting was favoured with the presence of another African traveller, Mr. John M. Cook, of whom it might be said that as Falstaff was not only witty in himself but was the cause of wit in others, so he was not only a traveller but the cause of travel in others. Mr. Cook had recently returned from the scene of his important public services on the Nile. He left Dongola about the 10th of last month, so that he was one of the very latest arrivals from that scene of intense interest. Of course, like other Government officials, he was under certain restraints of prudence and reticence, and therefore they could not ask him

to tell them all he knew; but he might say a great deal that would be highly satisfactory and reassuring to the meeting.

Mr. J. M. Cook said he had very little to say that would be new from a geographical point of view. When the British expedition was first contemplated, even the very highest officials in this country expressed the opinion that there seemed to be no one who knew anything of the actual navigation of the Nile between Wady Halfa and Dongola, or of what were supposed to be the clear parts of the river between those points. When the preparations for the expedition were under discussion in April last there really was no one who had recorded any practical experience of that portion of the river which had proved so difficult for our soldiers to pass over. When he had finished his part of the work he decided to go to Dongola, and to see for himself what the real obstacles to navigation were. Although he had been travelling on the Nile for sixteen years he had not the most remote idea of the enormous difficulties to be encountered, or he certainly should have hesitated running some of the risks that he had to run if he had been able to foresee them. But having accomplished the journey, he was glad to assure Lord Wolseley and the high officials in England that beyond the laborious portion of the navigation from Wady Halfa to Sakarmatta, 109 miles, which was the worst part the expedition had to traverse (there being five or six very serious cataracts to encounter, with a succession of rapids and rocks only just covered with the Nile water which, by its peculiar colour, prevented their being seen), there were only small cataracts, that were not dangerous. He had been puzzled to know why Hannek was ever placed as the third cataract of the Nile, for there was no cataract there at all, or anything to indicate that it had ever been one. It was a very small rapid in comparison with others. There were four or five cataracts between what was termed the second and the so-called third cataract, and that was one of the secrets of the delay in the concentration of the troops at Dongola for the advance on Khartum. It was quite true that during the high Nile season the Government sent very competent naval officers to survey that portion of the Nile and report upon it, but they could only report upon what they saw, and they could see nothing of what it would be when the troops had unfortunately to work their way up at low water. It was a succession of great difficulties, and in all his travelling experience and his contact with military movements nothing had pleased him more than to work day by day by the side of our soldiers on the river, especially the Staffordshire regiment, which was the pioneer regiment, and had to find out the channels and difficulties for those who were following them. He was near that regiment almost the whole of the time they were working their way up. The soldiers had had no previous experience whatever in river work, but they worked most freely and willingly under trying circumstances, and pushed along whistling and singing to keep their spirits up, and it was certainly a most interesting sight. The difficulties were chiefly these. In many points there was very shallow and rapid water. From Sarras to Sakarmatta, a distance of 74 miles, the rise was 450 feet as near as he could ascertain by his aneroid. He himself travelled under the most favourable circumstances, having the assistance of the Egyptian troops, and his was the only boat, except whalers, that succeeded in getting through from the Lower Nile to Dongola. Even the pinnaces were not able to go up the whole distance. His boat was only 24 feet long, 6 feet 6 inches beam, drawing only 20 inches of water, yet at five different points it required 170 men, in addition to his own crew, to pull it through the cataracts, and at one point seventy-five Dongolese had to be employed in addition. That would give some idea of the troubles that our soldiers had had to encounter. Out of the six or seven thousand troops working in the boats there was scarcely one case of serious illness. He himself did not come in contact with one case, and all the medical officers that he spoke to gave the same

report. The men were in splendid health. Of course they suffered the first few days, especially from blisters, having to walk on parched granite rocks tugging at their boats, which were moved along some days only one or two miles, while for five consecutive days his glass registered 90° in the shade, and was scarcely below 80° at night. Still the men worked along cheerfully, and the sickness was of no importance whatever. The sickness that had been mentioned in the newspapers was among the troops who had been stationed for some months at such places as Assuan and Wady Halfa, where they had had nothing to do. Considerable difference of opinion had prevailed as to the wisdom of sending out the whalers and the Canadian boatmen. When he was first asked his opinion he said it was not necessary to send out whalers, and that he could find plenty of boats in the country to work the expedition. He also thought then that it was not necessary to send out Canadian boatmen because sufficient natives could be found to do the work, but he was bound to admit now that in that opinion he was wrong. The necessary boats could not have been found in the Upper Nile, and it would have been impossible to conduct the expedition as far as Dongola by the river without the assistance of European boats. At least half the Canadians sent out were the finest boatmen he had ever come in contact with, and he was satisfied that the work they did, and the impetus they gave to the other men, would fully repay the Government for the cost of conveying them from Canada to Egypt. After ascending the 74 miles he made up his mind that no power whatever would induce him under any circumstances to come down the Nile through the cataracts and rapids that he had worked up, but there again he had to give way, and he did come down the Nile in one of the whalers. He passed through the whole of the cataracts of Dall, Akusheh, Tangor, Ambigol, and Semneh, and felt as comfortable and as much at his ease, after he had passed through the first cataract, as he did when sitting in his own easy chair in his library. After he saw the manner in which the Canadians steered through the first cataract he was perfectly satisfied that he need not trouble himself any more, and he accomplished in little over eleven hours the distance which took him thirteen days on the upward journey, though in the latter case he had all the assistance that the Egyptian army and Government officials could give him. That was quite sufficient to show how useful the boats were that had been sent out. It was not his province to say whether they were exactly the right description of boats, but he was quite satisfied they had done good work. Of course he had seen many things that would be of great interest to a general audience, but they did not come within the scope of a meeting of the Royal Geographical Society. None of the illustrations of the navigation that had appeared in the illustrated papers were overdrawn, and several of the most difficult small cataracts had not been represented in any of the illustrated papers. The question naturally arose, how many boats had been lost and how many lives had been lost by boats capsizing? Up to the time when he left Sarras, which was about the 12th December, the whole of the 800 boats with the exception of about forty or fifty had left Sarras, and he had met them at different points on the river. He only saw one entirely wrecked. Through a misunderstanding arising from the difference of language a Dongolese crew let go at the most inopportune moment, and the boat went down the cataract and was broken almost straight in two. That was the only whaler up to that time that had been capsized with any serious injury. Some days his boat could not go half an hour without striking on some rock, and although it had timbers an inch and a half thick, he had to take it out of the water several times to have it repaired. On one occasion there were twenty holes knocked in it at one cataract, and two days were required to repair it. He supposed that about 100 boats were injured, but only in such a way that the men could repair them in a short time,

and as a rule they were in the water again ready to go forward within an hour or two. A few lives had been lost, among them seven of the Canadians, but he believed if the matter were investigated it would be found that those Canadians were not real boatmen: they were men who were not accustomed to the working of boats. Five soldiers had been lost, one of them through getting on the wrong side of the rope: he was pulled into the cataract and carried away. He saw several of the soldiers fall into the habit of the natives of stripping themselves naked and pushing the boats, and one soldier who did so was carried away by an undercurrent. The loss of life had been remarkably small, and he was only surprised that hundreds of lives had not been sacrificed.

The CHAIRMAN said he was sure that the meeting would regard this unpremeditated communication by Mr. Cook as well deserving their thanks. The British soldier was a creature of vast adaptability. He could ride a donkey race at Epsom and mount a camel at Cairo, and do equally well in both circumstances. Many of them came from the purlieus of large towns, and were previously wholly unacquainted with river navigation, but a spirit of healthy, manly rivalry had turned them into admirable boatmen, as hard as nails, and probably as capable of passing rapids as the Canadians themselves. He wished on behalf of the meeting to thank Mr. Cook for the extremely interesting and comforting account he had given of the progress of the expedition which owed so much to him. But for Mr. Cook's great organising power and the influence he had acquired in the country the difficulties would undoubtedly have been much greater.

Dr. RAE said he was well acquainted with the voyageurs of Canada, and was delighted to hear that in Egypt they had manifested the same bravery and coolness which they had shown on the rivers of their own country. It was not surprising that there had been some failures among them, for they were got together in a great hurry, and the number of inferior men might have been expected to be much greater. In North America there were two classes of rivers. At high water the Coppermine was probably the most dangerous river that any boatman ever ran down, and it was at the Escape Rapid that Sir John Franklin nearly lost his canoes. At low water, however, it was easy, as he himself had proved in 1849. On the other hand, there were rivers that were most dangerous at low water. In 1853, when attempting to reach Back's Great Fish River via Chesterfield Inlet, by a new river (the Quoich), the water was smooth, with scarcely a rapid to be seen, but on his return when the water had fallen it was full of dangerous rapids. Running down a rapid was a most delightful sensation.

The CHAIRMAN, as an old voyageur, also expressed his satisfaction at the manner in which the Canadians had done their work in Egypt.

The following paper was then read, in the absence of the author, by the Secretary, Mr. Douglas W. Freshfield—

"Journey from Shiraz to Jask, via Forg and Minab." By J. R. Preece, Esq.

Will be published, with Mr. Preece's route survey and the discussion which followed the reading, in "Supplementary Papers," vol. i. part 3.

NEW BOOKS.

(By E. C. RYE, *Librarian R.G.S.*)

EUROPE.

Bædeker, K.—*Le Nord de la France jusqu'à la Loire, excepté Paris. Manuel du Voyageur.* Leipzig (Bædeker) and Paris (Ollendorff): 1884, sm. cr. 8vo., pp. xxx. and 270, 5 maps and 23 plans. (*Dulau*: price 6s.)

——— *Le Midi de la France depuis la Loire, et y compris la Corse. Manuel du Voyageur.* Leipzig (Bædeker) and Paris (Ollendorff): 1885, sm. cr. 8vo., pp. xlv. and 362, 11 maps, 17 plans, and a panorama. (*Dulau*: price 8s.)

These two volumes, by M. A. Delafontaine, complete Bædeker's 'France,' of which the first part issued was 'Paris et ses environs.' The second of them is bound so as to be easily separable into five parts, describing the south-west to the Pyrenees, the Pyrenees, the south-east to the Rhone, with Auvergne, the French Alps, and the Valley of the Rhone, with Cévennes, Provence, and Corsica. These are each complete in themselves. Minute care has been expended on the plans and maps, which form the special features of this series.

Stanford's Compendium of Geography and Travel.—Based on Hellwald's 'Die Erde und ihre Völker.' EUROPE, by F. W. Rudler, F.G.S., and Geo. G. Chisholm, B.Sc. Edited by Sir Andrew C. Ramsay, LL.D., F.R.S. With Ethnological Appendix by A. H. Keane, M.A.I. London (Stanford): 1885, large post 8vo., pp. xviii. and 617, maps and illustrations. Price 21s.

Completes the educational series of which the former volumes have been from time to time noticed in our 'Proceedings' since the publication of 'Africa,' in 1878, by the late Keith Johnston. As in the preceding volumes, the plan of the original work has had to be materially modified, and much has had to be actually re-written as regards the physical part, though the political and social portions have not been subjected to equally extensive alteration. Twelve of the maps are physical, two political, and one linguistic. The ethnological and statistical parts are kept separate.

AUSTRALASIA.

McKerrow, James.—*Report of the Survey Department, New Zealand, for the year 1883-84.* By James McKerrow, Esq., Surveyor-General. Wellington (George Didsbury): 1884, folio, pp. 1-4, i.-x., and appendices 1-76, maps and plans.

This Report is distinguished by its unusual amount of geographical matter, and large number (16) of maps and plans. The amount of the general field-work of the twelve months is very considerable, the areas brought under trigonometrical and topographical survey aggregating 4500 square miles, at a cost of very nearly 90,000*l.* The more important of the surveys in the North Island are those of Mr. Lawrence Cussen in that part of the Auckland District known as the King Country, and of Mr. C. A. Baker, Contract Surveyor, who completed the maps of about one thousand square miles of the wild bush Native territory to the east of Opotiki, in the Urewera country, thereby giving a good start to the topographical survey of the extensive East Cape district, an important work long delayed through native opposition, but now arranged to be gone on with by a member of the staff, with reasonable hope of meeting no serious obstruction; many natives, indeed, are stated to be eager for the survey to proceed, so that they may have their titles investigated by the Native Land Court. Mr. Cussen's major triangulations of the King Country will cover an area of nearly 5000 square miles. The network of triangles is already over one half, and the remainder is expected to be completed during the ensuing season. He has, in laying out the work, reconnoitred the country, and furnished a very interesting

report on its natural resources. The area is about 3,000,000 acres, lying principally between the Puniu, Lake Taupo, and Mokau, in some places easily accessible, well watered, abounding in timber, with outcrops of brown coal, and having within it some good, open, agricultural land, consisting of limestone, volcanic, and alluvial soils. Over this valuable and extensive area, the native population is estimated at only 4000—Mr. Cussen himself not actually meeting 500 Maoris in all his wanderings; he was struck with the evidence everywhere to be seen of a once large native population. Mr. Cussen's report above mentioned does not contain any narrative, but gives results and a descriptive summary. His triangulation was commenced in the last week of December 1883, the country west of Lake Taupo being visited in the beginning of the following April, so that it was about a year after the adventurous journey of Mr. Kerry Nicholls, whose book was noticed in the August No. of 'R.G.S. Proceedings,' 1884. He is of opinion that the quality and quantity of agricultural land in the King Country have been over-estimated by most people, and says that the open country between the Puniu and Mokau rivers, through which the Waipa and its tributaries flow, contains the only extensive area of good agricultural land that he has seen. This comprises about 700,000 acres, bounded to the east by the Rangitoto, Ranganui, and Wharepuhanga ranges, and to the west by broken, wooded country extending northward from the Pirongia ranges to the Mokau at Tautoro. Indications of other good land, usually very broken, are given, interspersed with thousands of acres of wretched pumice-flats, covered with stunted scrub and dried tussock grass. There are about 300,000 acres of broken country between the west of Lake Taupo and the valley of the Ongarue, much cut up by deep gullies, containing good volcanic loam and sterile tracts, often divided by merely small streams, and bearing much valuable timber, mostly accessible from the Te Awamutu and Marton railroad. West of the Waikato is another large broken tract, called the Kaiangaroa, containing about 100,000 acres of poor land, intersected by ravines, with bare rocks and landslips everywhere visible. Finally, the Maraeroa plains at the head of the Waimeka comprise from 60,000 to 80,000 acres of fairly good open country, though some of it is poor, with pumice on the surface.

Among the remaining operations of the survey having other than professional interest, is the account of the exploration by Mr. Gerhard Mueller of the bush country inland to the main range from the coast-line between Jackson's Bay and Martin's Bay (north of Milford Sound, on the west coast of the Middle Island). The knowledge of the topography of this region, of immediate importance from the proximity of two struggling settlements, has long been locally felt to be very meagre and unreliable; and an additional incentive to its exploration is afforded by the supposition that the unknown back country is auriferous, as for many years a few adventurers have made a living by washing gold from the sands along the sea-beach and the beds of streams. Mr. Mueller's reconnaissance survey between Cascade Plateau and Jackson's river on the north, and Lake McKerrow and Hollyford valley on the south (illustrated by a very excellent map, modestly termed a topographical plan), shows that a splendid inland road can be made, presenting no difficulty whatever, from the Cascade plateau to the junction of the Pyke and Hollyford; he has also found a large quantity of very good land in the Cascade valley, patches of from 500 to 1000 acres of fair agricultural lands in the Hope and Gorge River valleys, and a narrow belt of good land from the north boundary, Otago, to near Lake Alabaster. All the valleys afford good pasturage. Geologically, the most remarkable feature appears to be afforded by the Olivine range, a red-violet mass devoid of almost every trace of vegetation from about 1000 feet above the Cascade river. The Cascade plateau and a great part of the Gorge and Jerry valleys country consist of the like formation, which is traceable as far as the Humboldt Mountains. A great part of the Hope range was found to be auriferous, and along the whole length of Gorge river traces of gold were found, the country, when once accessible, being likely to prove a great field for hydraulic sluicing, as the necessary water supply is obtainable.

The Report also contains some particulars of the results of time signals by

cable between Sydney and Wellington for determining longitude, and a comparison with other calculations as regards the exact position of Mount Cook, for which the independent determination of 11 hr. 39 min. 9.92 sec., by the late Surveyor-General, Mr. J. T. Thomson, comes nearest to that given by the Admiralty surveyors. The time signals result in 11 hr. 39 min. 5.45 sec. for Mount Cook, but until the differences between Sydney and the other Australian Observatories are revised, Mr. Russell abides by the 11 hr. 39 min. 7.79 sec. deduced from his independent observations.

The maps illustrating the Report now being noticed show the state of the Public Surveys and land tenure in the North and Middle Islands; the connecting triangulation across Cook Strait (effected by Mr. A. D. Wilson), the King Country (scale, 8 miles to the inch), the surveying work on hand and the roads to open Crown lands surveyed and constructed since 1881 in the North and Middle Islands, the country between Jackson's river and Hollyford valley above mentioned, and the settlements of Martin's Bay and Jackson's Bay. There are also plans of Latitudes and Longitudes of Trigonometrical stations, the Mount Cook Observatory, Wellington, and the closings of triangulations of the East and West Coasts by Mr. F. S. Smith and Mr. G. F. Roberts. These maps abound in information, and reflect the greatest credit on the department.

GENERAL.

Brassey [Lady].—In the Trades, the Tropics, and the Roaring Forties. London (Longmans, Green, & Co.): 1885, 8vo., pp. xvi. and 532, maps and illustrations. Price 21s.

A popular and profusely illustrated work, chiefly to be noticed here from its details of Islands (Madeira, Trinidad, the Bahamas, Bermudas, and Azores) on which modern information is not readily accessible to ordinary readers. Many of the illustrations are excellent.

Crawford and Balcarres, Ludovic, Earl of.—Bibliotheca Lindesiana. Collations and Notes. No. 3. Grands et Petits Voyages of De Bry. London (Bernard Quaritch): 1884, 4to., pp. viii. and 215, 33 pls. Price 3l. 3s.

A very careful and critical examination in detail of the various editions of De Bry's celebrated collection, with introductory notice of former essays on the same subject and a reproduction of title-pages and vignettes.

Peragallo, Prospero.—L' Autenticità delle Historie di Fernando Colombo, e le Critiche del Signor Enrico Harriase, con ampli frammenti del Testo Spagnuolo di D. Fernando. Genova (R. Istituto Sordo-Muti): 1884, 8vo., pp. 306.

Although not containing geographical matter, this work (for a copy of which the Library is indebted to its learned author) may be here noticed, as an addition to the literature on Columbus.

NEW MAPS.

(By J. COLES, *Map Curator* R.G.S.)

WORLD.

World.—Wandkarte der fünf Erdtheile in Mercator's Projection, von Berghaus-Goency. 8 Sectionen. J. Perthes, Gotha. Price 10s. (*Dulau.*)

EUROPE.

Bohemia.—Karte der Bezirks-Hauptmannschaften und der Eisenbahn-Linien im Königl. Böhmen. Prof. A. L. Bickmann. Scale 1:600,000 or 8.1 geographical miles to an inch. Prag. Price 6s. (*Dulau.*)

No. 11.—FEB. 1885.]

Norway.—Norge. Oversigtskart over Dybde- og Højdeforholde. Scale 1 : 2,400,000 or 32·8 geographical miles to an inch. Udgivet af Norges geografiske Opmaaling, Kristiania, 1883. (*Dulau.*)

—— Topografisk kart over kongeriget Norge. Scale 1 : 100,000 or 1·3 geographical miles to an inch. Udgivet af Norges geografiske Opmaaling, Kristiania, 1883–4. Sheets :—15c Fet, 25d Lillehammer, 26a Hamar, 46a Rindalen, 47a Selbu, 47b Essandjö, 50b Værdalen, 50c Stenkjær, 51a Björkvasklumpen, 52b Ramsö, 53a Namsos, 53c Fosnes. (*Dulau.*)

—— Den Geologiske Undersøgelse. Scale 1 : 100,000 or 1·3 geographical miles to an inch. Udgivet af Norges geografiske Opmaaling, Kristiania. Sheets :—25b Gjøvik, 26a Hamar, 46c Terningen, 47d Meraker, 50c Stenkjær. (*Dulau.*)

—— Generalkart over det sydlige Norge i 18 Blade. Scale 1 : 400,000 or 5·5 geographical miles to an inch. Sheet VIII. Udgivet af den geografiske Opmaaling, Kristiania, 1883. (*Dulau.*)

—— Romsdals Amt. Scale 1 : 200,000 or 2·7 geographical miles to an inch. S.E. and S.W. sheets. Udgivet af Norges geografiske Opmaaling, Kristiania, 1883–4. (*Dulau.*)

—— Kristiania Omegn. Scale 1 : 25,000 or 2·9 inches to a geographical mile. Bl. I. Udgivet af Norges geografiske Opmaaling, Kristiania, 1884. (*Dulau.*)

Russland.—Uebersichtskarte von westlichen—. 4 sheets. Kassel, Fischer. Price 12s. (*Dulau.*)

Sweden.—Sveriges Geologiska Undersökning. Ser. A a. No. 91. Bladet “Malmö.” Ser. A a. No. 88. Bladet “Vaxholm.” Scale 1 : 50,000 or 1·4 inches to a geographical mile, 1883–4. Ser. A 3. No. 10. Bladet “Kungälv.” Scale 1 : 100,000 or 1·3 geographical miles to an inch, 1884. Generalstabens Litogr. Anstalt, Stockholm. (*Dulau.*)

—— Karta öfver Berggrunden inom Norra delen af Kalmar Län utförd på bekostnad af länets Norra Hushållnings Sällskap genom Sveriges Geologiska Undersökning, Åren 1876–1881. Scale 1 : 200,000 or 2·7 geographical miles to an inch. Generalstabens Litogr. Anstalt, Stockholm. (*Dulau.*)

—— Översigtskarta visande fördelningen af Sveriges kartsystem i dess olika lag. Scale 1 : 500,000 or 6·8 geographical miles to an inch. (S.G.U. Ser. C. No. 63. Tafl. 2.) Gen. Stab. Lit. Anst. Stockholm. (*Dulau.*)

—— Geologisk Översigtskarta öfver Sverige utgifven af Sveriges Geologiska Undersökning. Scale 1 : 1,000,000 or 13·6 geographical miles to an inch. Sveriges Geologiska Undersökning. Ser. B a. No. 4. Södra bladet. Stockholm, 1884. (*Dulau.*)

As the production of a general geological map of Sweden has, for some years, been one of the principal works entrusted to the Geological Institute of Sweden by the Government, the publication of the southern sheet of this map seems to be a fitting time to give some information, gathered from the reports of the Institute, as to the materials used in its compilation, from which also the separate sheets of districts on much larger scales have been produced. A general geological map on the scale of 1 : 9,000,000 was compiled by Professor Axel Erdmann from the material at his disposal, and published by him in 1868 in an atlas which accompanied his paper on the Post-Tertiary formations of Sweden. This map, however, though it answered all the purposes for which it was published, was on too small a scale for detailed reference. As a result of the more extended geological surveys which have been made each summer from the beginning of 1868 until 1880, the Institute has been able to publish the above map and, in addition, many separate sheets on larger scales.

During the years 1876 and 1877 the chief object of the survey was the

collection of materials for the purpose of correcting a large number of sheets already published, and the completion of others which were required for the construction of two large maps on the scale of 1 : 200,000, one embracing all the bordering countries of Mälär and Hjelmär, and extending to the south as far as the Gulf of Slätbaken and the Göta Canal ; the other containing the country south of an imaginary line drawn from a point a little north of Varberg to one a little north of Paskallavik. These maps, which were drawn by hand, were sent to the Paris Exhibition of 1878, since which time they have been accessible to the public at the Geological Institute, Stockholm.

Notwithstanding the large amount of material that had been collected, it was found that several gaps had to be filled up before the present map on a scale of 1 : 1,000,000 could be satisfactorily produced, and the necessary steps were taken in 1879 and 1880 to obtain what was required. There was, however, another special difficulty which stood in the way of the publication of this map; this arose from the fact that there was no suitable map engraved on stone in the scale of 1 : 1,000,000 : the system employed on the "Carte de l'extension de l'argile glaciaire," and Harr's general map, though of the requisite scale, proved to be, in many other respects, unsuitable, and at one time it seemed doubtful if even the general map of the Topographical Department of the General Staff could be utilised on account of the great number of names and other geographical details which seemed likely to interfere with the necessary system of geological colouring, in itself sufficiently complicated.

This difficulty has, however, been surmounted by the efficient manner in which the "Imprimerie Centrale" has transferred the engravings on copper to the stone; the result has far surpassed all expectations, and has obviated what would otherwise have been a considerable delay and expense in the production of the map. The sheet already published is a beautiful specimen of cartography, and though a geological map, answers all the purposes, for general reference, of an excellent map of South Sweden.

Thüringen Waldes.—Topographische Karte zur Veranschaulichung der Besiedelungs-Geschichte des —. Zusammengestellt von Dr. Fritz Regel. Scale 1 : 150,000 or 2 geographical miles to an inch. Aus C. Vogel's Topographische Karte vom Thüringer Wald. Petermann's 'Geographische Mitteilungen,' Ergänzungsheft No. 76. Justus Perthes, Gotha. (*Dulau.*)

ORDNANCE SURVEY MAPS.

Publications issued from 1st to 31st October, 1884.

6-inch—County Maps :—

ENGLAND AND WALES: Sheets :—**Buckinghamshire** (part of) : Sheet 30 with parts of 18, 25, 26 (Hertfordshire); 35 with parts of 25, 26, 32, 33 (Hertfordshire); 2s. 6d. each. **Glamorganshire** (part of) : 39, 44; 2s. each. **Hertfordshire** (part of) : 20; 2s. 6d. **Oxfordshire** (part of) : 22, 30; 2s. 6d. each. Quarter Sheets :—**Bedfordshire** (part of) : 18 N.E.; 20 N.W.; 23 N.E., 23 S.E.; 24 S.W.; 32 N.W., 32 S.W., 32 S.E.; 1s. each. **Cornwall** (part of) : 16 S.E.; 29 S.E.; 1s. each. **Devonshire** (part of) : 27 S.W.; 51 N.E., 51 S.E.; 63 N.E.; 98 N.W.; 1s. each. **Gloucestershire** (part of) : 4 N.E. (with 50 N.E. Warwickshire and 44 N.E. Worcestershire); 6 N.E. with 49 N.E. (Worcestershire); 17 S.E. with 59 S.E. (Worcestershire); 26 N.W.; 44 N.W.; 46 N.W.; 48 N.W.; 50 N.E.; 52 N.W.; 1s. each. **Leicestershire** (part of) : 7 N.E.; 33 N.W., 33 N.E. with 8 N.E. (Rutland); 33 S.W., 33 S.E. with 8 S.E. (Rutland); 1s. each. **Norfolk** (part of) : 33 N.E., 33 S.E.; 41 N.W., 41 N.E., 41 S.E.; 45 N.E., 45 S.E.; 46 S.E.; 49 S.W.; 61 N.W.; 108 N.E. with 22 N.E. (Suffolk); 1s. each. **Northamptonshire** (part of) : 30 S.W.; 36 N.W., 36 S.E.; 37 N.E.; 1s. each. **Nottinghamshire** (part of) : 19 N.W., 19 S.W.; 23 N.E.; 25 S.E.; 1s. each. **Shropshire** (part of) : 7 S.W.; 8 S.W.; 14 N.W.; 16 N.E.; 18 N.E.; 19 N.E.; 20 N.W., 20 S.W.; 21 S.W.; 23 N.W., 23 N.E., 23 S.W., 23 S.E.; 24 S.W.; 28 N.E.; 34 S.E.; 78 N.E. with 3 N.E. (Herefordshire); 78 S.E. with 3 S.E. (Herefordshire); 83 N.W. with 8 N.W. (Herefordshire); 1s. each.

Somersetshire (part of): 8 S.W.; 13 N.E.; 16 S.W.; 17 S.E.; 18 S.W.; 19 S.E.; 24 N.E.; 24 S.E.; 25 N.W.; 26 N.E.; 28 N.W.; 28 N.E.; 29 S.E.; 1s. each. **Staffordshire** (part of): (42 S.E. with 48 N.E. and 48 S.E.); 44 S.W.; 45 N.W.; 46 S.E.; 60 N.E.; 1s. each. **Suffolk** (part of): 2 N.W. with 78 N.W. (Norfolk); 32 S.W. with 37 S.W. (Cambridgeshire); 32 S.E.; 40 S.W.; 44 N.W.; 48 N.E.; 63 S.W.; 1s. each. **Warwickshire** (part of): 57 S.W.; 1s. With Contours: (1 S.W. with 63 S.W. Derbyshire, 54 S.W. Staffordshire, and 22 S.W. Leicestershire); 1s. each. **Worcestershire** (part of): 9 N.E.; 9 S.W.; 18 N.E.; 26 N.W.; 33 S.W.; 35 S.W.; 39 N.W.; 41 N.W.; 41 N.E.; 41 S.W.; 41 S.E.; 1s. each.

IRELAND: **Meath** (revised), sheets 25, 29.

25-inch—Parish Maps:—

ENGLAND: **Bedford**: Cople, Ar. Bk.; Potton, 8 sheets and Ar. Bk.; Sandy, Ar. Book; Area Books of the following parishes:—**Cornwall**: Davidstowe, Lawhitton, Lesnewth, Tintagel, Treneglos. **Gloucester**: Barnsley, Driffield, Pauntly, Withington. **Norfolk**: Beeston with Bittering, 9; East Bilney, 3; Longham, 7; Milham, 9; Stanfield, 3; Taverham, Ar. Bk. **Shropshire**: Shipton, Ar. Bk.; Wentnor, Ar. Bk. **Stafford**: Rolleston, Ar. Bk.; Tatenhill, Ar. Bk.; Tutbury, Ar. Bk. **Suffolk**: Chediston, 8 and Ar. Bk.; Cratfield, 7 and Ar. Bk.; Dunwich 10 and Ar. Bk.; Kelsale, 11 and Ar. Bk.; Leiston, 13 and Ar. Bk.; Linstead Magna, 6; Linstead Parva, 5; Middleton, 7 and Ar. Bk.; Redisham, 5; Shadingfield, 6; Theberton, 7 and Ar. Bk.; Willingham, 5.

Town Plans:—

ENGLAND: Redditch, scale 1:500, 12 sheets.

IRELAND: 5 feet scale. Belfast (revised), sheets 29, 53.

Publications issued from 1st to 30th November, 1884.

1-inch—General Maps:—

IRELAND: Sheet 192 (with hills), 1s.

6-inch—County Maps:—

ENGLAND AND WALES: **Glamorganshire** (part of): Sheets 18, 26; 2s. 6d. each. Sheet 48; 2s. Quarter Sheets: **Bedfordshire** (part of): 11 N.E.; 12 N.E.; 32 N.E.; 1s. each. **Derbyshire** (part of): 57 N.E.; 59 S.E. with 47 S.E. (Staffordshire); 62 N.E. with 53 N.E. (Staffordshire); 1s. each. **Devonshire** (part of): 26 N.E.; 26 S.E.; 27 N.W.; 39 N.W.; 39 N.E.; 39 S.W.; 39 S.E.; 40 S.W.; 63 S.E.; 76 N.E.; 90 N.W.; 90 N.E.; 106 S.W.; 136 N.W.; 1s. each. **Gloucestershire** (part of): 2 S.W. with 44 S.W. (Warwickshire); 6 S.W. with 49 S.W. (Worcestershire); 6 S.E. with 49 S.E. (Worcestershire); 12 S.W. with 55 S.W. (Worcestershire); 42 S.W.; 43 S.E.; 44 S.W.; 46 N.E.; 47 S.E.; 49 N.W.; 56 N.W.; 56 S.W.; 58 N.W.; 1s. each. **Montgomeryshire** (part of): 10 N.W.; 10 S.W.; 15 N.E.; 15 S.E.; 16 N.W.; 43 S.E.; 44 N.W.; 49 N.E.; 1s. each. **Nottinghamshire** (part of): 18 N.W.; 18 N.E.; 18 S.W.; 18 S.E.; 23 S.W.; 30 S.E.; 53 N.W. with 18 N.W. (Leicestershire); 1s. each. **Norfolk** (part of): 57 S.E.; 89 S.W.; 89 S.E. with 3 S.E. (Suffolk); 92 S.W. combined with 6 S.W. (Suffolk); 99 N.E. with 9 N.E. (Suffolk); 1s. each. With Contours: 85 S.E.; 1s. **Northamptonshire** (part of): 29 N.W. with 29 N.W. (Warwickshire), 29 N.E., 29 S.W. with 29 S.W. (Warwickshire), 29 S.E.; 30 S.E.; 31 S.W.; 31 S.E.; 35 N.E. with 35 N.E. (Warwickshire), 35 S.E. with 35 S.E. (Warwickshire); 36 S.W.; 37 N.W.; 37 S.W.; 1s. each. **Rutland** (part of): 3 S.W.; 3 S.E.; 5 N.W.; 5 N.E.; 5 S.W.; 5 S.E.; 6 N.W.; 6 N.E.; 6 S.W.; 6 S.E.; 1s. each. **Shropshire** (part of): 11 S.E.; 12 N.W.; 12 S.W.; 13 N.W.; 15 N.W.; 16 S.W.; 22 S.W.; 27 S.W.; 28 S.E.; 49 N.W.; 1s. each. **Somerset** (part of): 13 N.W.; 16 S.E.; 17 N.E.; 17 S.W.; 21 N.E.; 25 N.E.; 26 N.W.; 26 S.E.; 27 N.W.; 27 N.E.; 27 S.W.; 27 S.E.; 29 N.E.; 42 N.E.; 1s. each. **Staffordshire** (part of): 32 N.W.; 46 N.W.; 49 N.E.; 64 N.E.; with 4 N.E. (Warwick-

shire): 1s. each. With Contours: 9 N.E. with 32 N.E. (Derbyshire); 1s. **Suffolk** (part of): 31 N.E. with 36 N.E. (Cambridgeshire); 31 S.W. with 36 S.W. (Cambridgeshire); 32 N.E.; 33 N.W., 33 S.E.; 39 S.E.; 42 N.E. with 42 N.E. (Cambridgeshire); 42 S.E. with 42 S.E. (Cambridgeshire); 51 N.W.; 59 S.W.; 60 N.W.; 76 N.E.; 1s. each. With Contours: 50 S.E.; 1s. **Warwickshire** (part of): 42 N.E. with 35 N.E. (Worcestershire); 48 N.E. with 42 N.E. (Worcestershire); 1s. each. **Worcestershire** (part of): 27 S.E.; 28 S.W.; 32 S.W.; 35 N.W.; 40 N.E., 40 S.E.; 42 N.W.; 48 S.W. with 5 S.W. (Gloucestershire); 1s. each.

25-inch—Parish Maps:—

ENGLAND: **Cornwall**: Altarnun, Area Book; South Petherwin, Ar. Bk. **Norfolk**: Aslacton, 8 sheets and Ar. Bk.; Beeston with Bittering, Ar. Bk.; Beetley, 9 sheets; Gressenhall, 9 sheets; Little Fransham, 4 sheets; Longham, Ar. Bk.; Tibenham, 9 sheets; Wendling, 6 sheets; Worthing, 4 sheets. Area Books of the following parishes:—**Shropshire**: Alveley, Billingsley, Highley, Romsley. **Stafford**: Burton-upon-Trent, Bobbington, Freeford, Fulfen, Penkridge. **Suffolk**: Blyford, Holton, Linstead Magna, Linstead Parva, Shadingfield.

Town Plans:—Scale 1:500:—

ENGLAND: Bedford, 22 sheets; Bromsgrove, 15 sheets; Gloucester, 37 sheets.

ASIA.

Lykia. Nach den Ergebnissen der in den Jahren 1881–82 ausgeführten österreichischen Expeditionen namentlich den Messungen und Zeichnungen der Herren O. Benndorf, E. Peteren, G. Niemann, F. v. Luschan, E. Löwy, mit Ergänzung durch die Itinerare früherer Reisenden. Namentlich die Karte von T. A. B. Spratt. Redigirt und gezeichnet von H. Kiepert. Scale 1:300,000 or 4·1 geographical miles to an inch. Geogr. Lith. Inst. u. Steindr. V. W. Greve, Berlin. Verlag von Carl Gerold's Sohn in Wien, 1885. 2 sheets. (*Dulau*.)

This is the finished edition of the map of Lycia, a preliminary issue of which appeared in 1882, and is compiled from the works and surveys of the gentlemen mentioned in the title.

Great care has evidently been taken in the production of the map, to convey a just idea of the topography of this mountainous region, and at the same time to avoid that confusion in hill shading, which, unfortunately, so often appears in maps. In this Dr. Kiepert has succeeded admirably, and by adopting the system of hill shading and contours, the physical features of the country are very clearly shown; at the same time the routes being printed in red, and streams in blue, are easily followed, even in those portions of the map where the hill shading is darkest.

AFRICA.

Afrique.—La Carte d'—. Scale 1:2,000,000 or 27 geographical miles to an inch. Sheets:—No. 9. Sta. Cruz de Ténérife. No. 10. Bir el Abbas. No. 11. In Salah. No. 18. Gogo. No. 25. Sokoto. No. 33. Benin. No. 34. Libreville. No. 35. Inquimma. No. 39. San Salvador. No. 40. Ounya-N'zingué. No. 43. St. Paul de Loanda. No. 44. Kabébé. Dressé et dessiné par le Cap^{me} du Génie Régnauld de Lannoy de Bissy. Publié par le Dépôt de la Guerre. Paris 1883–4.

These sheets form the third and fourth issues of the map of Africa which is in course of publication by the Dépôt de la Guerre, which, when complete, will consist of sixty sheets; at the present date twenty-four have been published, eighteen of West and West Central Africa, the remaining six being those of South Africa and the Cape Colony. Of the unpublished thirty-six sheets, fifteen are at present in course of preparation. The third issue of six sheets contains the Canary Islands and embraces all the country included between

lat. $28^{\circ} 50'$ N. and $21^{\circ} 40'$ N., stretching to the east to longitude $7^{\circ} 20'$ E. of Greenwich.

Sheet No. 9. Sta. Cruz de Ténérife, in addition to the Canary Islands, which have been reproduced from the marine charts, shows the sterile country called by Dr. Barth "Tiris el Ferar," or the country of deep wells. A portion of this sheet is an exact reproduction of the map published by Captain Vincent of the French Etat-major in his work 'Voyage d'exploration dans l'Adrar in 1860,' several positions of importance having been fixed by this gentleman, and others, previously laid down by M. Panet, corrected. All other positions are only approximate, but much useful information is given as to the nature of the country, the position of the wells and the routes by which this country has been traversed; among these latter is that followed by Bou el Moghdad between Senegal and Marocco in 1860-61.

Sheet No. 10, "Bir el Abbas," includes the western half of the desert of Sahara, and extends from the latitude of Wadi Draa in the north to Tondeni salt-mines in the south. The small portion of the coast-line contained on this sheet is taken from the Spanish survey conducted by M. Fernandes Duro in 1878, who discovered that the position assigned to the mouth of the river Draa was in reality that of the Chebika, and that these were two separate rivers and not, as shown in some of our most recent maps, branches of the same. The Draa, which takes its rise in the Atlas range, is, for the greater part of its course, on this sheet, marked with dotted lines, while that of the Chebika is laid down as if well known with a hard line. Some of the principal points have been fixed by astronomical observation, viz. the Wells of Telyg by Dr. Oscar Lenz, the village of Aougenlmen by M. Gatelo, &c. The routes of the following travellers are shown: Caillié, Panet, Bou el Moghdad, Oscar Lenz, and others. There are many notes with reference to the inhabitants, nature of the country, and positions of the oases and wells.

Sheet No. 11, "In Salah," contains a portion of the Ahaggar region and the Touat oasis. The positions given in Ahaggar can only be approximate, as very little is known to Europeans of this, the highest plateau of the Central Sahara. This is, however, not the case with the Touat oasis, which is comparatively well known, and maps of the surrounding country have been produced by several French officers, amongst others by Lieut.-Col. de Colomb and Captains de Castrès and Bernard. The position of Salah is the same as that assigned to it by Major Laing in 1825, other positions having been corrected from numerous observations and route surveys, and may be regarded as illustrating the actual state of our geographical knowledge of this region at the present date.

Sheet No. 18, "Gogo," contains the country of the Southern Touaregs which has never been visited by any European, and is therefore represented by a blank; but the south-west portion of this sheet shows the course of the Niger from Chergo to Garon, and has many notes with reference to the breadth of the river, portions of rocks, rapids, &c.

Sheet No. 25, "Sokoto" contains the kingdom of Gando, part of Sokoto, Mossi, Gourma, the northern portions of Ashanti, Dahomey, and Yoruba. In the S.E. corner the confluence of the Niger and the Binue is shown. This sheet is particularly interesting as containing the course of the Niger for about 800 miles, 150 of which is hypothetical. Numerous notes with reference to the natural features of the country and its inhabitants are given; all trade routes, as well as those of travellers, are laid down; indeed this sheet is full of valuable information.

Sheet No. 33, "Benin," shows the country between the coast and the seventh degree of north latitude, and from Cape Coast Castle, on the west, to the Boni river on the east. The islands of St. Thomas, Princes, and Anno-Bon are given on inset maps.

Sheet No. 34, "Libreville," contains all the country between the coast and long. $16^{\circ} 50'$ E. of Greenwich, and from Old Calabar river on the north to the Gaboon settlements in the south. A large portion of this sheet is necessarily blank, as much of the country is quite unknown to Europeans; much detail is, however, given in the neighbourhood of Libreville.

Sheet No. 35, "Inquimma." This shows the great northern bend of the river Congo, and with this exception, and a small portion of the Dinka country in the north-east of the sheet, it is a blank.

Sheet No. 39, "San Salvador." The region here shown is that to which the attention of the Berlin Conference has of late been particularly directed, embracing as it does considerable portions of the valleys of the Ogowé, Quillu, and Congo. A large amount of detail is given in this sheet, which extends from the Gaboon settlement to the river Ambrissette, and shows the course of the Congo for 200 miles above Stanley Pool, a plan of which, by Mr. Comber, is given in an inset map.

Sheet No. 40, "Ounya-N'zingué." In the southern part of this sheet is shown the country traversed by Pogge and Wissmann; on the east is given the course of the Upper Congo from Stanley Rapids to a short distance beyond the village of Makoura.

Sheet No. 43, "St. Paul de Loanda." This sheet shows the provinces of Loanda and Benguella; the results derived from the explorations of Capello, Ivens, and other travellers are laid down. Plans of the towns of Benguella, St. Paul de Loanda, and Ambriz are given on inset maps.

Sheet No. 44, Kabébé. This contains a portion of the southern basin of the Congo with its large river system. An amount of detail appears in this sheet which, at first sight, is astonishing; but a closer inspection shows that a considerable portion of it is hypothetical, and represented by dotted lines. Numerous routes are given.

At present this map is being brought out by a process of photo-zincography, but it is intended to be published, when complete, coloured orographically. The absence of anything to indicate hills or mountain ranges in the present edition detracts much from its value.

Afrika.—Karte von——, bearbeitet von J. I. Kettler und H. Müller. Scale 1:8,000,000 or 109·5 geographical miles to an inch. 4 sheets. Weimar, Geograph. Institut. Price 2s. (*Dulau.*)

Algérie.—Carte Topographique de l'——. Scale 1:50,000 or 1·4 inches to a geographical mile. Dressée, gravé et publié au Dépôt de la Guerre, Paris. Étant Chef du Service Géographique le Colonel Perrier, 1884. Sheets:—No. 3 Cap de Fer, No. 4 Herbillon, No. 5 Cap de Garde, No. 16 Bugeaud, No. 20 Chéraga, No. 21 Alger, Alger bis, No. 40 Tipaza, No. 41 Koléa, No. 42 l'Arba, No. 62 Marengo, No. 63 Blida, No. 84 Miliana, No. 127 Arzen, No. 153 Oran, No. 154 St. Louis, No. 182 St. Denis du Sig.

This is a new map of Algeria on a much larger scale than any hitherto published. When complete (according to the index furnished with the present issue) it will consist of 327 sheets. The hill work is shown by a combination of shading and contours, which is very effective. It is printed in three colours, and being on a scale of 1·4 inches to 1 geographical mile, every detail is shown. It is a very beautiful specimen of cartography.

Somali Halbinsel.—Josef Menges' Reise auf das Hochplateau der—— im Januar 1884. Nach Itinerarskizzen u. Kompasspeilungen entworfen u. gezeichnet v. Bruno Hassenstein. Scale 1:300,000 or 4·1 geographical miles to an inch. Justus Perthes, Gotha. Petermann's 'Geographische Mitteilungen,' Jahrgang 1884, Tafel 15. (*Du. uu.*)

Süd-Ost-Afrika.—Geologische Übersichtskarte von——. Nach eigenen Beobachtungen und den von Frd. Jeppé, C. Mauch, A. Hübner, E. Cohen, C. Griesbach, T. Baines, S. V. Erskine, E. Dunn und Anderen zusammengestellt von H. Haevernick. Scale 1:3,700,000 or 50·6 geographical miles to an inch. Justus Perthes, Gotha. Petermann's 'Geographische Mitteilungen,' Jahrgang 1884, Tafel 16. (*Dulau.*)

Tunisie.—Carte de la——. Scale 1 : 200,000 or 2·7 geographical miles to an inch. Edition Provisoire. Photozincographié et imprimé au Dépôt de la Guerre. Étant Chef du Service Géographique le Colonel Perrier, 1884. Sheets Tabarca, No. 2 Bizerte, No. 3 and 6 Cap Bon and Menzel-Heurr, No. 4 Béja, No. 7 El Kef, No. 8 Kairouan, No. 9 Mahedia, No. 10 Feriana, No. 11 Djem, No. 12 Sfax.

The production of the above sheets evidences considerable activity on the part of the French surveying staff in Tunis, and the issue of a photo-zincographic provisional edition of this map, on a scale of 1 : 200,000 would seem to be one that at no distant period the public will be in possession of a reliable map of Tunis. The present issue forms part of a map which it is intended to embrace the whole of Algeria as well as Tunis. The projection used is Flamsteed's, or more properly speaking, a combination of Flamsteed's and the conical projection. The topographical features are shown by hachures, and the heights of the more important elevations are given in metres.

AMERICA.

Canada.—Map of the Dominion of——, showing the Canadian Pacific Railways and its connections. Scale 1 : 1,743,000 or 23·8 geographical miles to an inch. Published by the Burland Lithographic Company, Montreal. On rollers.

Mexique.—Carte des migrations tolèques, d'après les explorations de D. (Dr.) L. Thuillier. Paris, Imp. Erhard. (*Dulaud*.)

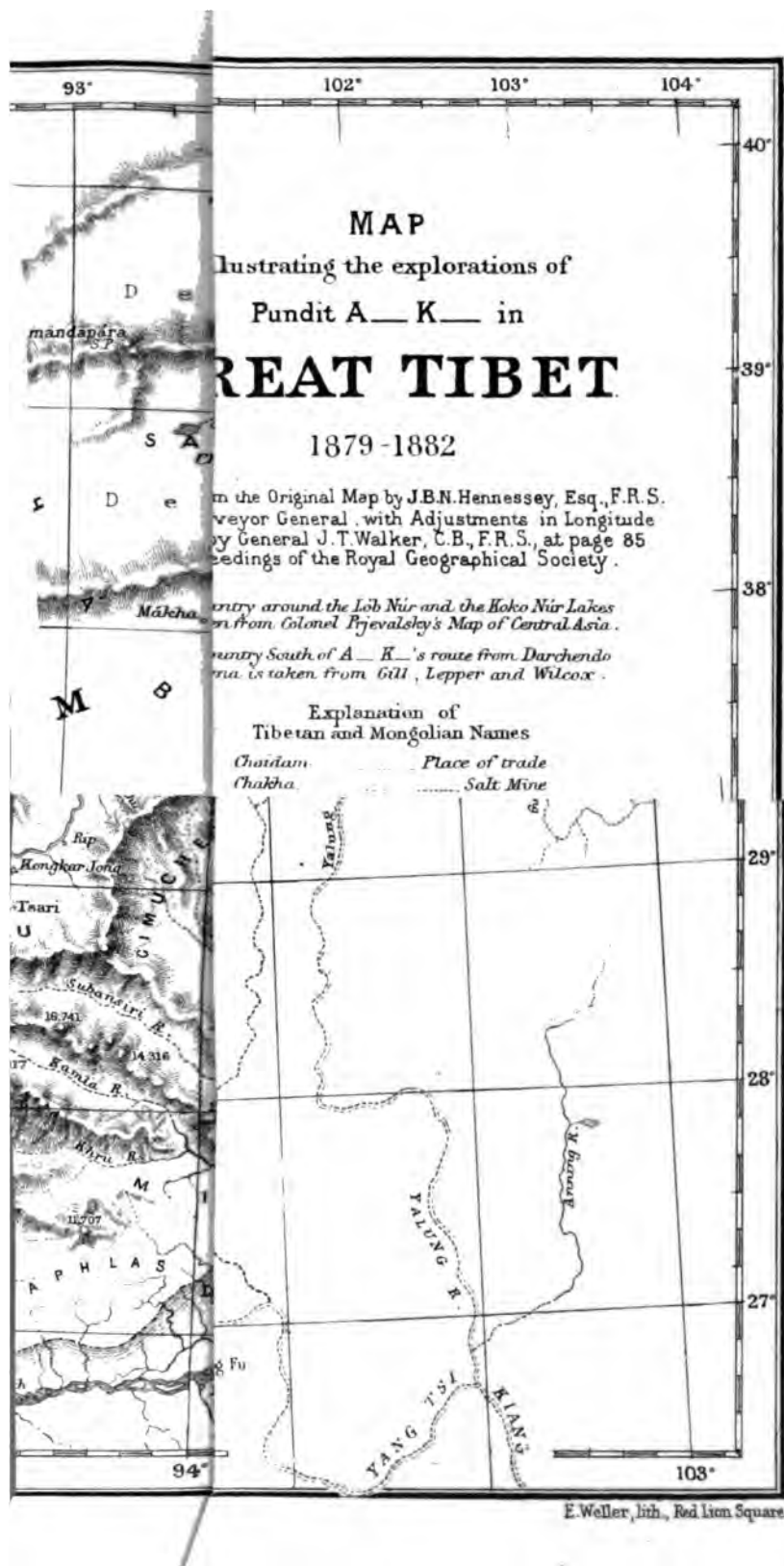
Venezuela.—Mapa Físico y Político de los Ee. Uu. de——. Scale 1 : 5,800,000 or 79·4 geographical miles to an inch. With inset maps and statistics. 1884.

CHARTS.

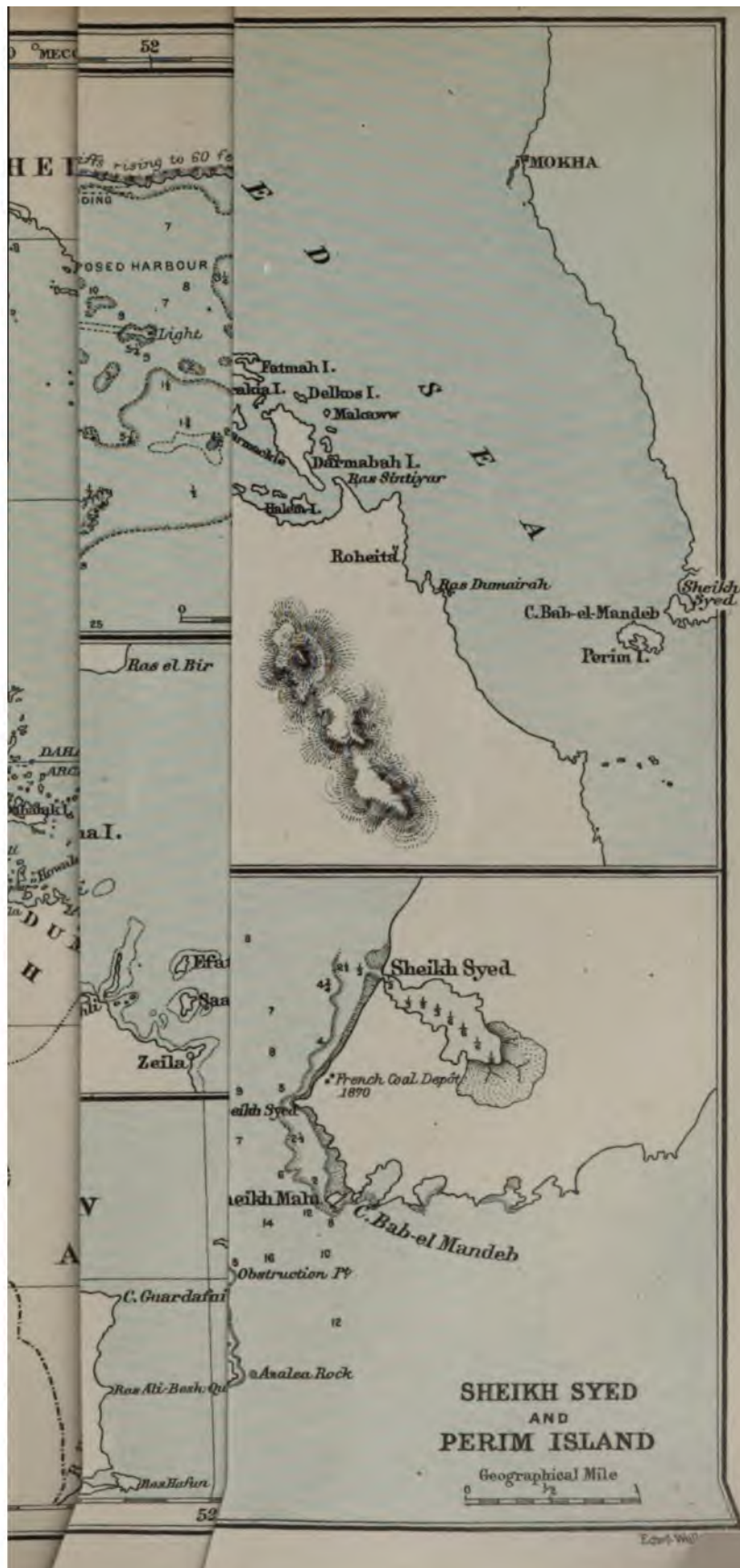
Admiralty.—Charts and Plans published by the Hydrographic Department of the Admiralty, in November and December 1884.

No.		Inches.	
887	m =	0·79	South America, Magellan strait:—English, Long, and Sea reaches. Price 2s. 6d.
1128	m =	1·4	Spain, east coast:—Ports Conte and Alghero, Port Torres. Price 1s.
1258	m =	0·3	Korea:—Approaches to Séoul, with Sir Jan group, and Ta-tong river. Price 3s.
1181	m =	4·0	England, west coast:—Lynmouth, Porlock, M Watchet. Price 1s. 6d.
1810	m =	0·1	Africa, east coast:—River Zambesi to Mozambique harbour. (Plan, River Antonio entrance.) 1
656	m =	various.	Solomon islands:—Anchorages in the vicinity of Honiara strait. Hawthorn sound. Blanche Choiseul bay. Price 1s. 6d.
1459	m =	10·0	China, Hong Kong:—Hong Kong road. Price 1s.
1458	m =	2·3	Spain, east coast:—Salon road. Ampolla road and Fangar. Torrevecia road. Estacio and Gros roads. Price 1s.
901	m =	6·0	Red sea:—Sawakin harbour. Price 1s. 6d.
14	Plan added.		Port Berenice.
2530	Plans added.		Shelter cove. Port Ross cove.
1277	Plans added.		Mexillones bay.
930	Plans added.		Talisse road. Kettlewell bay.

(*J. D. Potter, agent.*)









PROCEEDINGS
OF THE
ROYAL GEOGRAPHICAL SOCIETY
AND MONTHLY RECORD OF GEOGRAPHY.

The Kilima-njaro Expedition.

By H. H. JOHNSTON.

(Read at the Evening Meeting, January 26th, 1885.)

Map, p. 200.

I NEED not unnecessarily weary you with a detailed account of my reasons for going to Kilima-njaro, the Alpine district of Eastern Africa: it will be sufficient if I briefly mention that the British Association and the Royal Society wishing, for obvious scientific reasons, that this remarkable mountain-mass should receive a more thorough investigation than the hurried visits of previous travellers had effected, delegated certain of their members to form a Kilima-njaro Committee, and contributed jointly the sum of 1000*l.* to defray the cost of an expedition to East Africa. The Kilima-njaro Committee, taking into consideration the peculiar difficulties of African travel, hesitated to send out to Kilima-njaro any one who, though a trained naturalist, should yet have had no previous experience of the climate and mode of life in the Dark Continent. I, unfortunately, knew nothing of natural history collecting, but I had previously travelled in West Africa, and thinking that the knowledge acquired there might stand me in good stead on the East Coast, especially my acquaintance with Ki-swahili—the French of Eastern Africa—I applied to the Kilima-njaro Committee for the post of leader of their projected expedition, and after duly considering my application they accepted me as such. Unfortunately the sum of 1000*l.* placed at my disposal, although sufficient with due economy to meet the ordinary expenses of the expedition, would not permit of European collectors being taken, the cost of the passage-money, salary, and keep of two men amounting to nearly half of the sum already mentioned. However, this difficulty did not much concern me at the time as one or two collectors were promised from the Calcutta Botanical Gardens, whose expenses would have been defrayed by their employers in return for a set of specimens collected. But on arriving at Zanzibar, I was disappointed of their aid, for it was found at the last moment impossible to induce any Indian collectors to join an expedition to Central Africa. Sir John Kirk,

who was to me as he has been to most African travellers, the kindest and most useful of friends, endeavoured as far as possible to fill up this want and procured me two Swahilimen who had accompanied Dr. Fischer and who had acquired a rudimentary knowledge of skinning birds and drying plants. How far these men might have eased the burden on my shoulders, I cannot say, for shortly after my arrival and settlement on Kilima-njaro they deserted me on a frivolous pretext—viz. that the cold on the upper slopes of the mountain was prejudicial to their health—and established themselves at the court of a local chief, where they occupied themselves in organising his slave caravans to the coast, as will afterwards be described in this narrative.

The consequence of these disappointments and desertions was that before I had been long resident on Kilima-njaro I found myself with a great many tasks on my hands. I had to act as botanist, zoologist, entomologist, geologist, surveyor, master-builder, engineer, and head cook to the expedition. When treaties of peace and amity were to be concluded, I had to play a diplomatist's part. I can assure you I have assisted in one or two Kilima-njaro Conferences where the issues were of vital importance to the fate of the little expedition. When war seemed inevitable, the preparations for defence or attack, the humble attempts at military strategy, were equally of my own initiative; and altogether I think you will admit that I had not much chance of idling away my time amid the beauties of Kilima-njaro scenery. Perhaps on the whole I am to be congratulated, for never having the time to be ill, I was forced to keep in excellent health.

It seemed to me allowable to mention these circumstances to you before commencing the account of my recent sojourn on Kilima-njaro, in order that your criticism might be disarmed, and that you might realise how difficult it was to obtain even the small results which my expedition has effected.

I left Mombasa towards the end of May at the head of a caravan of 120 men. Of these about a quarter deserted on the road, but I reached the mountain with small loss of luggage at the beginning of June. I need not describe at any length the journey between Mombasa and Taveita as it has been already traversed a number of times by Mr. Joseph Thomson, and preceding African travellers. Arriving at Taveita I was taken for Mr. Thomson's younger brother, and as such received a very hearty welcome, Mr. Thomson having left a very good impression behind him. The accidental similarity in our names, the coincidence of our both being white, left no doubt in the natives' minds that we were, to use their own phrase, "*Mamá moja*"—"of one mother," consequently I was not asked for any land taxes, my elder brother having paid before me.

Before arriving at Taveita I had caught one very grand view of Kilima-njaro in the early dawn, and seen from a distance of 40 miles the

craterous shape of the larger dome was far more apparent than on a nearer approach ; indeed, owing to the southern slope of the crater being much rounded, until you either see its summit from a point of nearly equal elevation or observe it at a great distance you do not attain a proper conception of its true formation.

Until Thomson's return from East Africa so little was known of the politics of Kilima-njaro that it was popularly supposed that there was but one paramount ruler of the district, and he Mandara, chief of Moshi ; consequently I directed my steps to his kingdom and capital in the first instance, imagining that I had only to conciliate this personage in order to be able to range free and undisturbed over the whole of this African Switzerland. It was, however, a great mistake, because Mandara ruled over a very small tract of land, and only up to 6000 feet altitude, and being at constant war with his neighbours, and his little kingdom in a continual state of blockade, his protection as far as it influenced a peaceful residence on the upper slopes of the mountain was worse than useless. Had it not been that the time spent perforce in Mandara's country was nearly useless for natural history purposes—for I could not forget that I had come out principally to study the alpine district near the snow-line, and not the rich but more typically African fauna and flora at lower levels—I should little regret the months I passed in Moshi, for I regard Mandara as one of the most remarkable Africans I have ever met. He is a man whose portrait should be placed with certain others of his contemporaries, Rumanika, Mtesa, the Kasongo, whose lineaments stand out sharply amid the obscurity of Savage Africa, and whose names, so associated with the pioneers of African exploration, will certainly not fall into oblivion.

Mandara was formerly the only chief on Kilima-njaro who was known to the outside world. He can remember every white man who has ever visited the mountain. Rebmann passed through his country when Mandara was a small boy. Von der Decken—still remembered as the "Baroni"—came thither when the chief of Moshi was a youth and under the tutelage of his mother. Mandara received the missionary New, and on his second visit robbed him courteously of many valuables. Mr. Thomson's visit to this remarkable man is still in your remembrance ; and lastly, by every one's advice, I also made my way to his court before visiting any other part of the mountain. I took with me an important letter from Sir John Kirk, which officially recommended me to Mandara's good offices, that chief having previously entered into amicable relations with our Consul-General at Zanzibar, and expressed a wish for a white man to reside in his country.

Early in June I arrived in Moshi, after a journey of fourteen days from the coast, and Mandara received me with great affability. The letter from Sir John Kirk being written in the Arabic characters I had great difficulty in reading to him—in fact, Mandara declared afterwards that

he did not understand a word, but nevertheless the official seal was duly recognised and I roughly rendered the most important clauses into the vernacular. After the comparatively short delay of one whole day all the preliminary negotiations about choosing and purchasing a site for my settlement were concluded, and early one delicious morning when the dew still lay thickly on the fern-fronds in the Chaga lanes, and the sun cast long blue shadows over the wet turf of the village greens, we packed up tent and baggage and followed two of Mandara's soldiers, who were sent to show us our recently acquired property. After walking about two miles north-east from Mandara's and skirting a tremendous gorge we crossed a pretty tumbling stream, mounted another hill, and there we were, free to choose within certain limits the site for our future settlement. I soon fixed on a certain part of the hill-top—which was a prolonged spur of the parent mountain—where a kind of natural plateau was produced, and here determined to build my town. A tiny stream of water, artificially diverted from the rivulet of the valley (diverted at a much greater height and led in an artificial channel along the hill-side, while the original stream went tumbling down below) happily brought a never failing supply of water to our hill-top. A large and spreading tree gave a pleasant shade in the warm noon-day and further sheltered my tent from the occasional high winds; while lastly, and this was the greatest attraction to me, the view to be obtained from this site was almost unequalled in Chaga. Kilima-njaro rose above me to the north, while westward lay the grand peak of Méru, and southward and eastward stretched away vast hazy plains in the valley of the Ruvu. "All the world," said Mandara afterwards, "can be seen from your windows;" and though of course it was not a strictly true assertion it was plausible when uttered in view of such a splendid expanse of country—such a veritable map of Eastern Africa as might be seen from the site of my first settlement in Chaga.

I had hardly been a week in this place, which I found was called "Kitimbiriu," than I had cleared a large space of ground in the valley of my little stream, and sown it with a great variety of European vegetables; besides further planting it with onions and potatoes from the coast, and maize, sweet potatoes, and bananas supplied by the Chaga gardeners, who took a great interest in my agricultural operations. I also set some of my men to work building houses and making roads, so that very shortly my little "town" as the natives called it with respect, had assumed quite a flourishing look, and could boast of over twenty houses for the men, while I myself had a comfortable spacious residence, a kitchen, a cow-stable, and a fowl-house. I should mention that of the 122 men who had formed my caravan on leaving the coast, about ninety ultimately reached the mountain; sixty of these—that is to say all the Rabai men I had with me—were immediately dismissed when I had arrived with my goods at Kitimbiriu in Mandara's country; so that

after the first few days of my residence in Chaga, I remained with the thirty original Zanzibaris engaged in Zanzibar. As soon as the first week of my sojourn had passed, and I felt confidence in Mandara's protection, I sent twenty of the Zanzibaris back to Taita to fetch some goods left behind at a missionary's house. They were absent altogether some three weeks, and their return was marked by an unpleasant *contretemps*.

It appears that by going to live with Mandara I had made foes of all the other potentates on the mountain, several of the more prominent of whom had vowed eternal warfare. Accordingly, my returning caravan from Taita was attacked on the borders of Mandara's kingdom. Fortunately the man in charge—an old follower of Stanley on the Congo—managed to hold his foes at bay until nightfall, and knowing they would not fight after darkness had set in, he eluded them at midnight, and finally arrived at my settlement in the early morning. The enemy, however, hotly pursued, invaded Mandara's country, and devastated much of it with fire and sword. Mandara, in a spirit of true hospitality, made the quarrel of his guest his own, and advanced to drive back the invading hordes. A bloody battle was the result, ending in a doubtful victory for Mandara's forces. However, by this time I was able to marshal and arm a little force of twenty men, with which I marched to the field of action. We arrived there towards the close of the afternoon. Both armies were exhausted. Mandara's men were crouching down behind a deep fosse which surrounded their master's country. The enemy had posted themselves on an adjoining hill. I had fortunately matured a plan for striking terror into the hearts of my foolish foes, who only erred in ignorance, and whose blood I had no wish to shed. As soon as we arrived at this spot I directed my men to plant stout poles in the ground, and erect a kind of rough platform of boughs over which we placed a smooth hide. In fact, I made all the necessary preparations for a grand display of fireworks. No sooner had darkness set in than I blazed out on the astonished natives with Bengal lights, red fire, Roman candles, serpent squibs, and lastly, a magnificent flight of rockets. The terrified enemy scarcely waited to see the last of these. When the first rocket rose with a flaming shower and a shrieking rush into the air and then broke into a mass of falling stars, friends and foes alike fled in dismay, and we found ourselves alone on the field, whence we journeyed peacefully home by the light of a late rising moon.

After this incident Mandara and I became fast friends, and I then considered I might take advantage of this happy state of affairs to send twenty of my men back to the coast carrying collections, and on the return journey bringing me a supply of porters and more goods for trade and barter. Accordingly, when I had been a month in Mandara's country, I despatched this small caravan to Zanzibar, and remained in Chaga with only ten followers. Now began my difficulties. Firstly, the two

pseudo-collectors I had got from the coast became dissatisfied with their position, and began to intrigue with Mandara. They objected to collect on the slopes above on account of the cold, and they declined to collect in the plains below from fear of encountering hostile natives. Finally, they left my service and betook themselves to Mandara's court, where they were received with ominous favour.

The chief of Moshi gave them each a wife, several cows, and lent them some guns he had taken from Thomson. In return for these favours—for in Africa there is always a *quid pro quo*—they proposed to Mandara to direct profitably the disposal of his slaves on the coast, and further to enlighten him as to his dealings with white men. The first intimation I had of any change of disposition on Mandara's part was an abrupt order to hand over to him, immediately, on pain of expulsion, all my guns and ammunition, the order being accompanied by a verbal list of the contents of my armoury, which could only have been given him by my whilom head collector who had charge of my guns. I told Mandara in reply that I would *not* give him a single gun, nor anything whatever in compulsion, and that I would *not* leave the country. How could I indeed do so when I had eight carriers and fifty-seven loads? Then the chief of Moshi informed me that I might at any moment have my throat cut, my houses burnt down, and even my very memory—or, as he put it—soul erased. I answered this pleasant intimation by the assurance that were a hair of my head touched, the "Baloza" (Sir John Kirk) would come with a vast army to avenge me. This vain boast Mandara fortunately believed in part, so no violence was offered to me. I was, however, completely sent to Coventry by his orders. Any one of his subjects caught selling me provisions was seized and sold as a slave. This measure fortunately failed to starve me into submission, for I had with happy foresight laid in a huge stock of provisions and poultry, the former being safely stored in a hastily-built strong room of clay-plastered walls.

For a month, however, I lived in a miserable state of anxiety, constantly threatened by Mandara, whose mind was poisoned by the vile Swahili collectors, and almost unable to do any work in natural history, as gathering plants and shooting birds gave offence to Mandara's sensitive subjects, seeming to them to savour too much of sorcery. At length Mandara, not naturally bad at heart, wearied of this foolish disagreement, so unprofitable to him. He regretted the long and interesting conversations we had held in our friendly days, and yearned for another gossip. The two runaway Swahilis had turned out very stupid and useless men, much fonder of a slothful life of ease than hard work, and Mandara did not find himself any the richer for their presence at his court. Some slavery transactions had ended badly—altogether he was disgusted with them, and anxious once more to make friends with the white man. His peaceful overtures were well received

on my part. Mandara paid a solemn state visit to my town, and took away under his arm my last tin of biscuits. After this a large market was held on my settlement, my men were once more able to visit the native villages, and the remainder of my stay in Mandara's beautiful country may be described as halcyon days. But I was never able tranquilly to enjoy this period of peace. I could not forget the object of my mission, and every morning I turned an anxious glance on the snows of Kilima-njaro, which rose so seemingly near to my abode, and yet were separated from me by serious obstacles of man's making.

At this period Mandara's country was simply blockaded by his many enemies. Every point of egress from his kingdom was carefully watched, and all who tried to quit the boundaries of Moshi, were it merely to snatch a bit of firewood, were promptly pounced on and killed. Nevertheless, I made many desperate efforts during the month of September to ascend the mountain to the snow-line, but I was never able to succeed, although Mandara lent me each time guides and soldiers. Once, indeed, I reached a height of 14,000 feet, but just as I was tranquilly filling my portfolios with plants, a large band of Wa-kibosho—the most bitter foes of Mandara and the leaders of the coalition formed against him—were seen approaching at a round trot, covering themselves with their shields and waving their spears in the air. I had just time to form my little band of sixteen into a square, and waited with anxious heart the onset. Fortunately, in the middle of their charge the Wa-kibosho stopped short. There, between us and them, unheeded by me, stood my theodolite poised on its tripod stand. Before the arrival of the enemy it had been got out for the purpose of taking a few observations, and there it still stood, its levels, no doubt, as well adjusted as when I had previously left it. This harmless instrument filled the Wa-kibosho with sudden dread. It was doubtless some engine of sorcery, so powerful that I needed but to place it between myself and my foes, and I could then await their onslaught with equanimity. The Wa-kibosho therefore paused, their war cry ceased, they gazed uneasily at the theodolite, and, to my intense relief, slowly withdrew to a neighbouring hillock from the top of which they watched our proceedings. After a quarter of an hour of immobility on either side the Wa-kibosho suddenly left their post of observation at a hand-gallop and disappeared into the forest below. I had a short deliberation with my men, who insisted on at once returning to Mandara's, alleging that the Wa-kibosho would return in greater numbers and cut off our communications below, thus severing us from our food supplies. I then suggested that instead of returning direct to Mandara's country we should continue our exploration of the mountain and then descend through Useri on the plains below and thus reach Taveita. This also was overruled, and fortunately, as I now feel convinced that in passing through the country of Mandara's populous foes our little band of

sixteen men would have been massacred to a certainty. Finally, my perplexities were rudely solved by Mandara's soldiers, who took up their arms and walked towards the homeward path, telling me I might follow or not as I liked. There was therefore no other course open to me but to return, and it was as well I no longer delayed. The latter part of our downward journey resulted in a headlong flight—a terrible "*sauve qui peut*"—with the people of Kibosho, who did, as my guides predicted, return in greater force, pursuing behind, and had it not been that Mandara, hearing rumours of war from one of his scouts, had sent a force of 200 men to our assistance, I should certainly not have been addressing you to-night, for unused to such a rapid flight over slippery tree-trunks and glissades of mud, I was soon exhausted, and the distant cries of the Wa-kibosho sounded ever nearer in my anxious ears. My men were demoralised with fear, but my young Indian servant, Virapan, stood by me bravely. Mandara's soldiers had a brief skirmish with the enemy to cover our retreat, and then escorted me back to my settlement, whither their master sent his salaams and a fine goat to express his pleasure at my safe return.

As a contrast to this episode I may mention that shortly afterwards I was wandering alone with my servant in the plains below Moshi, when we encountered a band of the same people—perhaps fourteen or fifteen in number—who were proceeding for some trading purposes to Kahé. I clutched my gun silently, prepared to sell my life dearly, but after looking at me in an embarrassed manner, the leader of the troop, arrayed in the bravery of colobus monkey skins, merely said in a hesitating voice, "Oh, you are the Mzungu (white man) of Mandara, are you not?" I said, "I am." Then he murmured "Good day," and I returned the salutation politely, and we parted. I afterwards met this man when I had made friends with his chief, and I asked him how it was he had passed me that time without fighting. "Oh," he said, "I did not think you were so white!"

At length, after much anxious expectation, my headman returned from the coast with more goods and a reinforcement of fifty men, which together with one or two runaways from Swahili caravans, raised my available force from eight to over sixty men. I was now able to be independent of native help. I quitted Mandara's country, bidding an almost affectionate good-bye to that remarkable man, who in spite of threats and blusterings and an overwhelming force of armed men at his command, had never robbed me of a penny's worth of goods. I told Mandara the reason of my withdrawal, viz. that as long as I resided with him I could never live at peace with the other potentates of the mountain; and then, promising faithfully to return, and when I did so bring with me an iron chair, an iron bedstead, and a European dog, I wrung his hand and almost regretfully turned my back on the most interesting character I have met in Africa.

I must now hurry on to that part of my paper which deals more particularly with Kilima-njaro. Transferring my headquarters from Moshi to Taveita, I created in that forest stronghold a most delightful home wherein I securely stored my goods, and whither I returned to rest and recruit after every fatiguing journey. Here at Taveita I invited delegates from the most important chiefs of the mountain to assemble, and after a solemn conference we made formal friendships, exchanged presents, which on the part of the Wa-chaga took the form of fat sheep and oxen, and then once again started to ascend Kilima-njaro. This time I proceeded to Marang'a, the chief of which, in spite of professions of sincere amity, was more exorbitant in his demands than Mandara had ever been. However, he was simple enough to be satisfied with vague promises of future munificence when I should have accomplished my task. Accordingly he gave me guides, whom I subsidised heavily, and together with forty of my own carriers we turned our faces once more towards the snow. We crossed the cultivated zone, which ends at about 5500 feet hereabouts, entered a heathy district with pleasant grassy knolls and many streams of running water, and camped beside a lovely fern-choked brook at 6500 feet, the whole ascent being very gradual.

The succeeding day we passed through stunted forest, not unlike an English woodland, where the trees, however, were hung with unfamiliar ferns and creepers and where deliciously scented parasitic begonias trailed their pink flower-bells from branch to branch. The dracæna, which is cultivated by the Wa-chaga to form hedges, here grew wild. Tree-ferns (*Lonchitis pubescens*) were abundant and handsome. Above 7000 feet the orchilla moss draped the forest trees in long grey festoons. Tracks of elephants were very numerous. The other noticeable inhabitants of the forest were dark-blue touracoes and tree-hyraxes. Wart-hogs were occasionally met with up to 8000 feet. At 9000 feet we camped for the night by a small spring of water in the midst of a grand bit of forest not of that stunted character that marks the lower woods. I caught a chameleon and many beetles here, also shooting touracoes and pigeons. The next day we walked several miles eastward to find a good place for a settlement, close to water, and not too high up so that my shivering followers might not suffer unreasonably from cold. I selected an admirable spot on a grassy knoll rising above the river of Kilema, which takes its source near the base of Kimawenzi. The altitude of this spot was nearly 10,000 feet. It was about four miles in a direct line from Kimawenzi and about seven from Kibê. Here my men with wonderful rapidity built about fifteen cosy huts thatched with heather and admirably fashioned to resist both rain and cold. The whole settlement was surrounded by a stout fence or boma as a wise precaution against possible assault. Having seen every one carefully installed and protected from the—to us—severe cold (for the thermometer descended every night to one or two degrees below freezing-point), I transferred my own

quarters to a higher elevation and began industriously to collect. In the meantime bands of natives, our whilom foes, arrived from Kibosho bringing provisions for sale, both good in quality and cheap in price, so that all anxiety about provisioning myself ceased and I was even able to enjoy delicious beefsteaks eaten with a furious appetite at 11,000 feet above the sea.

Unfortunately, I had severely hurt my knee-cap by a fall over some slippery boulders, and had to spend several days in enforced idleness, but soon as I was able to get about I began my rambles up the mountain. My first excursion was to the base of Kimawenzi. The terrible hurricane of wind, however, that raged round this jagged series of lava peaks prevented me from continuing the ascent, although I doubt if it be possible for any one to reach the summit owing to the want of foothold. The snow varies very much in quantity on Kimawenzi. Sometimes the whole peak will be covered down to the parent ridge, with only the precipitous rocks peeping blackly through the mantle of white. At other periods the snow will be reduced to an insignificant patch, and the reddish sand which fills the crevices and glissades between the lava rocks will be left exposed to view. This change from an almost complete snow cap to nearly no snow at all may be effected in twelve hours.

Although I collected a good deal around Kimawenzi, my great object was to reach the snows, and if possible the summit of Kibô. To do this it would be necessary, owing to the time occupied in the ascent, to sleep on the way. Accordingly, I could not go alone, but must induce a few followers to accompany me to carry my necessary impedimenta. My Indian servant, never afraid of anything, of course volunteered, but I had to leave him behind, as he was not only disabled with severe ulcers on his legs, but I was afraid to leave the settlement without some responsible person in charge. So I selected three of my followers who looked agile and strong, and were not more cowardly than the majority—by cowardly I mean afraid of the unknown and the unseen: they were brave enough in the presence of ordinary African dangers—and providing each man with a warm blanket and loading them with my own coverings, food, and implements for collecting and observing, I waited until the morning mists had somewhat cleared, and then taking an affectionate leave of the rest of my caravan, who looked upon my companions and myself as rash men courting death, I turned my face to that quarter of the sky where the heavy concentration of cloud masses indicated the presence of the great Kibô.

Starting at nine, I walked upwards with few stoppages until 1.30. At first we crossed grassy undulating hillocks, the road being fairly easy. Then we entered a heathy tract scorched and burnt with recent bush fires, but, higher up, where the blaze had not reached, the vegetation was fairly abundant and green. Small pink gladioli studded

the ground in numbers, an occasional largish gladiolus of a vivid crimson gleaming vividly out from the tufted grass. About 12,600 feet we struck a pretty little stream flowing S.S.W., and lower down carving its way through a tremendous ravine, the sides of which were clothed with thick vegetation, and gaily lit up with the brilliant red leaf-shoots of the protea (*Protea Abyssinica*) shrub. At the place where we crossed the stream the banks were shelving, and above the little ferry the water fell in pretty cascades through a rift in the higher ridge of rock. About this spot the surrounding scenery had lost much of its accustomed asperity. On the further side of the stream was a patch of level greensward, somewhat spoilt by the buffaloes who came thither to drink and sport, and who had rucked up and befouled much of this little lawn. Strange sessile thistles grew here, nearly five feet in circumference, belonging, I believe, to the genus *Carduus*, *Carduus chamacephalus*. Also an extraordinary lobelia, *Lobelia Deckeni*, three to four feet in height, with a teasle-like crown of silvery green bracts and bright blue blossoms. Other remarkable plants were the lovely *Cynoglossum amplifolium*, with rich ultramarine flowers, and an extraordinary arborescent *Senecio Johnstoni*, looking somewhat like a banana in the distance, but in reality consisting of a tall, black, smooth trunk, 20 to 30 feet in height, and surmounted by a huge crown of broad leaves, interspersed or headed up with bunches of yellow blossom. This strange plant grew abundantly in the streamlet's bed, and its trunk was so weakly rooted and so rotten that in spite of its height and girth, I could pull it down with one hand.

Tufts of chervil and other tall Umbelliferae, and patches of vivid green moss overhung the water, which itself was lovely in its absolute clearness and in the bright wavelets and streaks of foam which marked its hurried descent. At this altitude of nearly 13,000 feet bees and wasps were still to be seen—their very presence, too, seemed to account for the vivid colours of the flora—and bright little sunbirds darted from bush to bush, gleaning their repast of honey. As we ascended on the further side of the stream valley we came to some strange boulders or smoothed masses of rock. They had been eaten away underneath into small caverns, large enough for a man to creep into. I went inside several, but detected nothing whatever resembling either past or present animal occupation. The last fern I saw on Kilima-njaro, as I went upwards, I picked from under a sheltered shelf of one of these caverns. Beyond and about these huge slabs of rock the ground became pappy and boggy with water, in fact, some three or four small springs issued from about the rocks, and seemed to have done their work in carving the cave-like hollows within. Putting down my hand to gather a small plant by the roots I was surprised to find the water warm. At first I fancied it an illusion, and called to one of the men to try, when he also exclaimed at the unexpected warmth. Then getting out my thermometer I found

the temperature of the trickling mud—for it was little else in this bog—to be 91° Fahr.

Mounting high above the rivulet the scenery became much harsher. Vegetation only grew in dwarfed patches as we passed the altitude of 13,000 feet, and the ground was covered with boulders, more or less big, apparently lying in utter confusion, and without any definite direction. They were not very difficult to climb over, and even seemed to act as irregular stone steps upwards. In their interstices heaths of the size of large shrubs grew with a certain luxuriance, and bright yellow Euryops flowers studded the occasional patches of bare earth, while every now and then my eye alighted with pleasure on lovely clusters of pink everlasting flowers growing, where they did grow, so thickly that they presented a blushing sheet of rosy bloom. About 13,700 feet I saw the last resident bird, a kind of stonechat, apparently. It went in little cheery flocks, and showed such absence of fear that I had to walk away from it before shooting, to avoid shattering my specimen. After this, with the exception of an occasional high-soaring kite or great-billed raven, I saw no other bird.

On reaching a height a little above 14,000 feet, I stopped again to boil the thermometer and refresh myself with a little lunch. The result of my observations gave this altitude as 14,117 feet. Throughout this ascent, which was easy to climb, I suffered absolutely nothing from want of breath or mountain sickness, although my three Zanzibari followers lagged behind, panting and exhausted, and complained much of their lungs and head. Moreover, every gust of wind breaking the silence of the mountain made them look round with ashy countenances, convinced that the Bogy of Kilima-njaro was upon them, coming *in propria persona* to chastise our presumption. I often dreaded that their panic would overcome them, and that they would turn and flee, carrying with them my collecting things, instruments, and provisions. Moreover, about this time we occasionally heard distant rumblings of thunder echoing among unseen cliffs and valleys; and although these weird sounds might be only referable to that cause, still I confess they did resemble somewhat the rising murmurs of an angry spirit—or, at least, they did to my men's imaginations, for I myself, never having heard an angry spirit murmur, was not in a position to discriminate. However, I resolved not to try their powers of endurance much longer, so, on arriving at the place where I stopped to lunch—a protected hollow surrounded by huge flattened boulders—I determined to fix on this as our sleeping-place for the night, and accordingly directed the men to collect the dry roots of the heaths and other fair-sized shrubs as fire-wood. They were further instructed to proceed to the small stream which rose hard by and fill our gourds there with water, and afterwards to stretch out a macintosh in guise of a tent, so that we might have some shelter against possible rain and wind. Other directions for

rendering our instalment as comfortable as the unfavourable circumstances would permit were also given; and having left the men in seemingly better spirits, I hastened to continue my ascent while the weather would permit.

Mounting up a few hundred feet higher than the last stopping-place, and rounding an unsuspected and deep ravine, I arrived close to the base of a small peak which had been a continual and useful point to aim at during the whole journey from my station. I was now at an elevation of 15,150 feet, and on the central connecting ridge of Kilima-njaro, and could see a little on both sides, though the misty state of the atmosphere prevented my getting any good view of the country. This ridge, which from below looks so simple and straight, is in reality dotted with several small monticules and cut up into many minor ridges, the general direction of which is, on the southern side, from north-east to south-west. To the eastward I could see the greater part of Kimawenzi rising grandly with its jagged peaks and smooth glissades of golden sand. Westward I still looked vainly in the piled-up clouds, for the monarch of the chain still remained obstinately hidden, and I was at a loss as how to best approach his awful crown of snow. At length, and it was so sudden and so fleeting that I had no time to fully take in the majesty of the snowy dome of Kibô, the clouds parted and I looked on a blaze of snow so blinding white under the brief flicker of sunlight that I could see little detail. Since sunrise that morning I had caught no glimpse of Kibô, and now it was suddenly presented to me with unusual and startling nearness. But before I could get out my sketch-book and sharpen my chalk-pencil the clouds had once more hidden everything, indeed, had enclosed me in a kind of London fog, very depressing in character, for the decrease in light was rather alarming to one who felt himself alone and cut off at a point nearly as high as the summit of Mont Blanc. However, knowing now the direction of my goal, I rose from the clammy stones, and clutching up my sketch-book with benumbed hands, began once more to ascend westwards. Seeing but a few yards in front of me, choked with mist, I made but slow progress; nevertheless, I continually mounted along a gently sloping, hummocky ridge where the spaces in between the masses of rock were filled with fine yellowish sand. There were also fragments of stone strewn about and some of these I put into my knapsack. The slabs of rock were so slippery with the drizzling mist that I very often nearly lost my footing, and I thought with a shudder what a sprained ankle would mean here. However, though reflection told me it would be better to return to my followers and recommence the climb to-morrow, I still struggled on with stupid persistency, and at length after a rather steeper ascent than usual up the now smoother and sharper ridge I suddenly encountered snow lying at my very feet, and nearly plunged headlong into a great rift filled with snow that here seemed to

cut across the ridge and interrupt it. The dense mist cleared a little in a partial manner, and I then saw to my left the black rock sloping gently to an awful gulf of snow so vast and deep that its limits were concealed by fog. Above me a line of snow was just discernible, and altogether the prospect was such a gloomy one with its all-surrounding curtain of sombre cloud and its uninhabited wastes of snow and rock, that my heart sank within me at my loneliness. Nevertheless, I thought "only a little further and perhaps I may ascend above the clouds and stand gazing down into the crater of Kilima-njaro from its snowy rim." So turning momentarily northwards I rounded the rift of snow, and once more dragged myself, now breathless and panting, and with aching limbs, along the slippery ridge of bare rock which went ever mounting upwards. I continued this for nearly an hour, and then dropped exhausted on the ground, overcome with what I suppose was an ordinary attack of mountain sickness. I would rather not dilate on my feelings at this time. No doubt there are many here present to-night who have scaled the giant peaks of South America, India, and Armenia, and who would laugh at the puny difficulties that Kilima-njaro presents—a mountain that can be climbed without even the aid of a walking-stick, and where the most serious obstacles arise from mist and cold which would scarcely deter a cockney from ascending Snowdon. But the feeling that overcame me when I sat and gasped for breath on the wet and slippery rocks at this great height was one of overwhelming isolation. I felt as if I should never more regain the force to move, and must remain and die amid this horrid solitude of stones and snow. Then I took some brandy-and-water from my flask, and a little courage came back to me. I was miserably cold, the driving mist having wetted me to the skin. Yet the temperature recorded here was above freezing-point, being 35° Fahr. I boiled my thermometer, and the agreeable warmth of the spirit-lamp put life into my benumbed hands. The mercury rose to 183·8. This observation when properly computed, and with the correction added for the temperature of the intermediate air, gives a height of 16,315 feet as the highest point I attained on Kilima-njaro. I thus came within a little more than 2000 feet of the summit, which is usually estimated to reach an altitude of 18,800 feet.

Having looked at my watch, I found it was now nearly half-past four, so I resolved to hasten back as quickly as possible to my improvised shelter, for the clouds were thickening, and thin showers of sleety snow were falling. A high wind arose and whipped my face with the icy rain, and made it very difficult to keep my footing on the slippery ridge. At length I reached the boulders and the sand, then descending with greater ease entered once more at about an altitude of 15,000 feet the region of vegetation. Keeping in view the small hillock I have already mentioned as such a useful landmark, I ultimately found my way back to the spot where I had left the men. What was my agonised surprise

to find on searching the sheltered hollow, that it was deserted and abandoned! I hesitated but little. Sooner than remain there without blankets, food, or fire, I would endeavour to regain my station, even though I had to wander all night on the lonely flanks of the mountain; so starting off in the waning daylight, I hurried over the now easy descent at a pace that soon quickened into an irregular run. I crossed the stream at the well-remembered ford; and cheered with the sight of old landmarks, and warmed with the violent exercise, I marched straight on in the direction of my little village. The mists dispersed, the moon shone out brightly, I could clearly distinguish familiar hill-tops, and on reaching once more the banks of my own river, I then had an unfailing guide to follow until the glimmering watch-fires of my settlement glanced out from our bushy stockade, and the loud voices of men broke the still and frosty air. As I stepped in through the palisade, and appeared before my almost terror-stricken men, I saw I was at first taken for my own ghost, but when I had spoken a few sentences in a very real and energetic tone to the three culprits who had deserted me, the other men crowded round me in an ecstasy of joy, kissing my hands, patting me all over to assure themselves that I was back in the flesh, and assuring me that if I had taken *them*, *they* would never have left me to perish in the snowy solitudes above—no! not if the Demon of the Mountain had appeared visibly in all his terrors to confront them. It appeared that my three followers had remained for about an hour in the place I had left them, and then seeing I did not return, had been seized with an irresistible panic, had caught up their loads, and had returned helter-skelter to the station. Fortunately they had not lost the collections, so after a short rebuke I was disposed to condone their fault; the more so, as I felt so thankful to return to warmth and shelter and familiar faces, that I little cared to pass the night in unprofitable scolding.

The next day I was so worn out with fatigue that I could not go far beyond the settlement, and therefore spent my time chaffering with the men of Uru and Kibosho, who had arrived to hold another market. On the morrow, I once again made an attempt, this time alone, to reach the snows of Kibô, and just managed to do so, but the weather was again atrocious, and the bitter cold compelled me to return at an early hour, to avoid being benighted far from camp. The rain cleared about five o'clock, and on my homeward tramp I had one magnificent view of the dome of Kibô, thickly and freshly powdered with snow and roseate under the rays of the declining sun. I was struck by the numbers of great-billed ravens which together with one hawk circled and soared high up, near the snows of the mountain. Perhaps some adventurous buffalo had come to grief and they were watching from the heights above his struggles in a native's pitfall. I saw the dung and footprints of these buffaloes up to 14,000 feet, and it is possible that they pass backwards

and forwards over the central ridge between the northern and southern slopes of Kilima-njaro. I also saw the footmarks of a large antelope, possibly a koodoo, to judge from the natives' description. I might here remark that in spite of a month's residence in these high altitudes, not to mention previous visits at other times, I never succeeded in seeing a specimen of the buffalo or big antelope who penetrate in their wanderings up to the very snow, although of their existence I have not the smallest doubt from the distinctness and freshness of the footmarks so frequently met with, and from the presence of droppings only a few hours old. The natives, also, ascend the mountain to heights of 12,000 and 13,000 feet, solely for the purpose of digging pitfalls to entrap these creatures. I have questioned them many times and exhaustively, and they assured me the buffalo and koodoo were identical with those inhabiting the plain below. The natives' shields were often made of untanned buffalo-hide, and the horns were turned into powder-flasks. I should further mention here that the elephant, at all times an excellent mountaineer (I have seen him on the Chella mountains in Angola at 8000 feet), wanders up Kilima-njaro to as great a height as the buffalo. I have not only seen his recent traces, but at a height of 13,000 feet I actually saw three of these animals crossing nimbly a stream valley, and mounting with agility the steep slopes that rose above the water. At night, too, round our settlement we would frequently hear their loud shrill trumpeting. A species of hyrax—possibly "dendro-hyrax"—inhabits the slopes of Kilima-njaro up to 11,000 feet. It affects always the neighbourhood of trees. During the night, in the forest, these creatures call loudly to one another. The young hyraxes, even in captivity, exhibit great power of modulation in their voices, and their loud cries are almost human in tone.

I dare not linger more diffusively on the interesting subject of the fauna inhabiting these lofty regions, but must now hasten to describe my last journeys round the mountain and my return to the coast. On the 18th of October I found myself, most unwillingly, obliged to leave our elevated settlement and return to Taveita. The relatively great cold we had experienced had reacted very unfavourably on my men's health, and I feared that a longer delay might render them quite unfitted to carry burdens. I intended, however, to make my return journey entirely through a new and hitherto untraversed country, and this project somewhat consoled me for leaving the summits of Kilima-njaro still unconquered.

All having been made ready for the start and our native guides still under the impression that we were going to return to their rapacious master—indeed imagining that we could go nowhere without their aid—we left our alpine settlement with its grassy slopes and forests of arboreal heaths and took the path running eastward round the upper slopes of the mountain. Descending a few hundred feet we

found ourselves in comparatively dense and luxuriant forest, with a rich undergrowth, contrasting strongly with the bleak grassy steppes only a trifle higher in altitude. Farther on we arrived at an old camping place of our former upward journey, at an altitude of 9000 feet. Here we shot many touracoes and pigeons, and remained in this pleasant leafy spot until the early afternoon. Then came the critical time. We had no intention of returning to Marang'u, and therefore wished to part company with our guides. I undertook to lead the men back to Taveita by compass and map. Accordingly, little heeding the cries and mocking laughter of our guides, we started boldly along a faintly marked path running eastward. At first all went well, but soon the path died away, and not daring to stop or hesitate, I plunged boldly into the trackless bush. The men followed meekly, but the absence of any road rendered their journey very trying. After about an hour of struggling through the rank bush undergrowth, during which I keenly felt my responsibility, we emerged on a little open grassy patch. Here all, uninvited, put down their loads, and very free criticism on our mode of travel was uttered. To add to our disagreeables, incessant rain had been falling since two o'clock. Whilst stopping here to rest and hold a consultation, like a despotic monarch who feels his power threatened and seeks to appease his subjects by granting them a constitution, I invited all the men to take part in our deliberations, and suggest the best course to be followed. At this juncture the native guides arrived, having followed in our footsteps anxious to see the result of our self-guidance. Wishing to transfer my responsibility to other shoulders, I offered them a present of cloth if they would lead us through the trackless forest to the precincts of Rombo; whence I knew we could find our way unaided to Taveita. They consented, and once more we entered the dusky woods, following a zigzag track by means of the rough paths which elephants had just made. Often before us lay the smoking dung of these lords of the forest, but we failed to catch a sight of their august persons. The timber in these woods was exceptionally straight and fine. To our universal relief we quitted this gloomy region of dense dank forest at about half-past five, and emerged on a beautiful park-like country of grassy hillocks, undulating plains, running streams, ferny hollows, and tidy copses. Hereabouts we camped out, and I, ravished with the beauty of the scenery and with the magnificence of the view (for I could see nearly all round the mountain, the altitude being 8500 feet), set myself to work to create in imagination a fair city of civilisation which should rise on these grassy slopes, and dominate the cultivable lands below. Here, on these two hillocks, I would build my twin forts, and here should be my terraced vineyards; there cornfields and gardens, and there a handsome stone house, my preliminary palace. As I mused thus, the sinking sun emerged from a curtain of cloud and shed a wonderful rosy radiance

over the beautiful scene. The distant valley of the Ruvu, with its wriggly lines of green forest, the mountain-mass of Ugweno, hills and hillocks in all directions, the nearer forests, the natural lawns (only awaiting tennis to be perfect), and, lastly, the awful, jagged, snow-streaked and spotted Kimawenzi rising to the north—all was irradiated with a tender smiling light, the very shadows of which were attenuated and softened. Then until darkness set in I stood on one of the seven hills of my African Rome, and pondered on the possibilities of its existence.

On the succeeding day we discovered, early in the morning, that our guides had really and actually deserted us, so we were left entirely to our own resources for finding the way to Taveita. However, I was confident, and the men scarcely less so, for no matter how distant our goal might be, we at least could see it in the valley before us. Nevertheless, not wishing to pursue a course which would lead us through Mamba, Mwika, or the inhabited regions on the south-western flank of Kimawenzi, I was obliged to direct myself more to the northward, and consequently out of the direct route to Taveita. We travelled for hours through a delightful country, made for a European settlement, and singularly English in look, with open grassy spaces, which seemed in the distance ruddy cornfields, and shady woods and copses full of fine timber. Plenty of running streams of clear water intersected this gently sloping, almost level plateau, which, although such a tempting idyllic land, was entirely uninhabited, save by buffaloes and elephants. The average elevation of this country was between 8000 and 7000 feet, and the temperature consequently almost cool, ranging from 43° at night to 70° in the midday warmth. After some four hours' walking from our camp we crossed the long ridge that marks the southern flank of Kimawenzi, and began to descend the eastern slope of the mountain. Soon we emerged on a kind of heath-like country, and then looked forth on a splendid view stretching from Mwika to the mountains of Bura and Ukambani (the Kiulu range), with Jipe on one hand, and the river Tzavo on the other. At our feet lay the banana-groves of the inhabited belt of Useri and Rombo. To the latter we directed our descending steps, and soon encountered in the bush some of its stray inhabitants, a savage-looking set, probably posted there to give notice of attack from the dreaded Mandara who has occasionally visited the country on his slave-raiding expeditions. These men fled precipitately at our approach and raised a cry of warning to the inhabitants below, the result being that on entering their territory we found them armed to the teeth and resolved to resist our further approach. After a little parleying—which was conducted under difficulties, for they clearly spoke a very different dialect to the ordinary Ki-chaga tongue—we gave a small present in cloth and requested to be shown the road to Taveita. They accepted my gift somewhat sullenly, and made no move to guide us

through their country. However, holding the men well in hand I quietly pursued our downward journey, always keeping in view the distant green streaks in the valley below which marked the windings of the river Lumi. Our progress was repeatedly hindered and occasionally stopped by the ever-increasing and turbulent force of savages who pressed on our flanks clamouring for a division of our goods. I threw them a few yards of red cloth as a present to their sultan. This acted like the articles which are thrown to pursuing wolves from the inmates of a hunted sledge—it served for a moment to delay their oncoming, and I had time to form my somewhat scattered men into line and press resolutely on towards the plain. The natives followed with increased hostility, mistaking our resolute retreat for a cowardly flight. As a matter-of-fact I did not much fear them in spite of their numbers, as they carried no guns and were but armed with ill-made spears, so that in case of hostilities I could doubtless have slaughtered many; but my anxiety the whole time I lived on Kilimanjaro was to avoid war and bloodshed. Although in a pitched battle you may easily gain the advantage, yet the news that you have resorted to violent methods to attain your end spreads through a district like wildfire, and everywhere you are received with deep distrust or open enmity. I am of the opinion of Mr. Thomson that it is preferable to suffer many indignities sooner than be the first to shed blood. I also agree with him that it is insanity to travel about Africa unarmed. Never anywhere was that saying truer, “*Si vis pacem para bellum.*” So we held on our way resolutely and quietly, paying no heed to the verbal provocations of the Wa-rombo. When at length we emerged on the open country, I turned and saluted them with some very vigorous terms in Ki-chaga, and they for a while dispersed; afterwards for some distance hanging on our heels like hyenas ready to snap up any loiterer or lag-behind. However, at nightfall, we reached the pretty river Lumi, and established ourselves in an old camp of Thomson’s. Through the night the Wa-rombo lurked in our precincts, but fortunately feared to attack. The next day, after actually coming to blows with these annoying savages and having in self-defence to fire our guns, one Mrombo got his arm broken with a shot, and one of my porters was slightly wounded with a spear. However, at the first discharge of guns the Wa-rombo fled, and we reached Taveita without further difficulty. I am glad to state parenthetically that on passing near their country a few days afterwards I received a deputation from the people of Rombo, who expressed their sorrow for what had occurred, and wished to make friends with me. I accepted their advances, exchanged presents, and in future was annoyed no more. I rested a day or two at my charming settlement at Taveita, and then set out on a trip which I had meant to extend round the mountain, but owing to the smallness of my band of followers I was not able to succeed, as the Masai were prepared to give trouble, and I had not goods enough to satisfy their demands. I penetrated a few miles

beyond Useri, along Thomson's route, and as this journey has been described to you by Thomson himself, I will not repeat its familiar characteristics here. I again returned to Taveita, and leaving a few men behind to occupy my settlement, I went off to Lake Jipe, where I spent a few days and caught a slight fever. Then finding my funds would not support the expedition beyond the end of November, I made a rapid journey to the coast by way of Pare, Usambara, and the Rufu river to Pangani. This route I found a very pleasant one. Well supplied with water, food abundant and cheap, and the descent from the inland plateau of 2000 feet altitude to the coast so gradual that you might positively have driven a waggon the whole way from Pangani up to the base of Kilima-njaro without an obstacle. At one place, Ngurungani, we came plump upon a band of 1000 Masai proceeding to the coast on a marauding expedition. At first they surrounded us threateningly, and my small force of sixty men, who could only muster some ten serviceable guns amongst them, seemed very inadequate for defence; but I resorted to the only arm of the weak—deceit. I told the Masai we had severe smallpox amongst us, and produced as a proof of my assertion an albino negro who happened to be in my caravan. Believing me implicitly, the Masai retreated in horror, and only asked one favour of me—viz. that I would not follow too closely on their steps. This I willingly conceded; and in an hour's time, of 1000 Masai and their herds of cattle, goats, and donkeys, there was not one left in our vicinity. We met subsequently many other bands of these strange people on our way to the coast, but they never troubled us, having had their spirit broken by recent defeats inflicted by the people of the Ruvu. I have seen from first to last a good deal of the Masai at Mandara's at Taveita, and in the vicinity of Useri, but after Mr. Thomson's admirable study of these people any remarks of mine would be superfluous.

At Zanzibar, finding there were no fresh funds to enable me to return to Kilima-njaro, I paid off the last of my faithful followers, many of whom had accompanied Thomson on his great journey, and took my passage on the British India steamer to Suez in quite a sulky frame of mind, as sorry to leave my beautiful mountain as many people are to quit England. Travelling overland from Suez, I arrived in London not much more than six weeks since I caught my last glimpse of the snows of Kilima-njaro.

I may perhaps give you in conclusion a few notes respecting the scientific results of this expedition. I have collected upwards of 300 species of plants, among which some twenty or thirty are new to science. I cannot speak more definitely because the examination and comparison of the collections at Kew are still in progress. I have sent back at different times about 130 birds, some of which are new species, some hundred butterflies, and about the same number of beetles and other insects, fresh-water crabs, frogs, lizards, chameleons, snakes, the skins

and horns of a few mammals, and lastly, geological specimens and examples of the arms and accoutrements of native races. I have collected vocabularies of four different languages and have made grammatical studies of two. I have also endeavoured to illustrate the scenery and natural history as far as possible by drawings done from nature. My chronometer breaking down soon after my departure for the interior prevented my taking any astronomical observations, save one or two for latitude, but as this Society liberally furnished me with a handsome grant of instruments, I have been enabled to make a few rough surveys with prismatic compass and boiling-point thermometer, which may be of use in filling in the details of a map of Kilima-njaro. I will further add to these observations a few notes on climate. During the three months of my stay in Moshi, at an altitude of 5000 feet, the average readings in the shade of the thermometer were as follows:—At noon, 71° ; at 8 P.M., 60° ; at 6 A.M., 58° . The lowest reading at noon was 68° ; the highest 80° . The lowest reading at midnight was 54° ; the highest 62° . In my higher stations, at 10,000 and 11,000 feet, the lowest night temperature registered was 29° ; the highest at noon, 65° . At Taveita the highest registered was 90° at 3 P.M.; the lowest at 4 A.M., 60° .

During the month of June there were 6 days of rain; during July, 8; August, 9; September, 7; October, 8; first half of November, 5. The proper rainy season is from November to May, but in Kilima-njaro and in its vicinity it occasionally rains throughout the year.

Previous to the reading of the paper,

The PRESIDENT said that those who were present when Mr. Johnston gave a description of the Congo and the country adjacent to it, on the memorable occasion of M. Lesseps' visit to the Society, would not have forgotten the pleasure derived from listening to his paper. Since then Mr. Johnston had visited the region of Kilima-njaro, which was included in the great journey performed by Mr. Thomson. He went there on behalf of the Royal Society and of the British Association for the Advancement of Science. As he had only recently returned the information he brought back might be regarded as quite fresh; at any rate, it would be an important addition to the information obtained by Mr. Thomson.

After the paper,

Mr. THOMSON said he had travelled almost entirely round Kilima-njaro, and had had opportunities of studying the mountain such as no other traveller had ever had. His experience of the chief Mandara was curiously similar to that of Mr. Johnston. There was a period with Mandara in which he was childlike and bland, when he treated his visitors right royally and hospitably, and there was also a period when he began to put the screw on, doing it most effectually and making threats of a most bloodthirsty description. His bark, however, was worse than his bite. Having obtained what he wanted, or as much as he could get, he would begin to regret that he had done so, and become once more the ideal princely savage again, treating his visitors in the most hospitable fashion. He compelled him (Mr. Thomson) to give him many things which he certainly did not wish to give, especially European articles. He desired to have a complete suit of clothes, even to the boots, and he (Mr. Thomson) only wished that he might be compelled to wear

the boots. The sketches exhibited by Mr. Johnston, though they gave a faithful view of Kibo and Kimawenzi, gave a rather erroneous idea of the whole mountain of Kilima-njaro. The two elevations just mentioned might be described as only excrescences on an enormous mountain, which in its greater axis was nearly sixty miles across, and in its shorter axis over thirty miles. The mountain impressed the traveller particularly by its simplicity and grandeur. There were very few picturesque details about it. It consisted of a dome and peak, and that was almost all that could be said about its general aspect. One of the most remarkable features about it was the number of streams that flowed down its southern side, while on the north side there was not even a single rill. On the east side there were several streams flowing from the mountain, but they all started from the bottom of the mountain in full volume, not springing from the mountain as they did in Chaga. On the southern side Chaga was formed of a series of terraces or platforms, which detracted from the appearance of the mountain, though they formed its richest and most fertile part. This feature was not observed to the north of Kilima-njaro, for it rose at an even angle from 3000 to 18,000 feet without a break of any description. There was not a valley, or ridge, or hill to be seen upon it, and the whole mountain could be seen both in its vertical and its horizontal extent at one glance. One of the most interesting facts in the paper was the mentioning of a hot spring at a high elevation. That, of course, indicated that the volcanic forces were still existing, though dormant, in the mountain, and might break forth at any time. Mandara told him that about four years ago an earthquake shook the mountain, until the people could hardly stand. The whole region was remarkably volcanic, and enormous accumulations of lava and tuffs were to be found throughout the Masai country, and to the west of Kilima-njaro. Mount Buru was still active, and there were traditions of lava streams having been seen flowing down the mountain, while the little lake Chala, on the east side of Kilima-njaro, was a crater lake, and the people living in the neighbourhood said that on its side there once stood a Masai village, which was blown in the air. They added that when a person stood on the rim of the lake, which was most beautiful and picturesque, the lowing of cattle and the barking of dogs could still be heard proceeding from the spirits of those animals that were annihilated in the catastrophe. In conclusion, he expressed the extreme pleasure with which he had listened to the charming paper by Mr. Johnston.

The Ven. Archdeacon FARLER said it was nearly ten years since he went to Usambara, a country to the south-east of Kilima-njaro, to begin missionary work there. He had travelled through the length and breadth of the land, and found it a most beautiful country with primæval forests of magnificent trees, and an enormous growth of orchids and ferns of every description. From what he had heard from Mr. Thomson and Mr. Johnston, similar scenes extended from Usambara right up to Kilima-njaro. He had been particularly struck by the description given in the paper of the grassy slopes at an elevation of about 5000 feet around the base of Kilima-njaro. As there was now considerable talk about new countries where Europeans might settle, he fancied that these lawns might in some future time be cultivated, for Usambara was a healthy region from the coast right up to Kilima-njaro. Some years ago the young Sultan of Usambara paid him a visit, and the attendants said they could not let him remain in the lowlands more than two or three days lest he should catch the fever, while in the highlands no one ever caught the fever. That was a sign that the highlands were particularly healthy. There was at present, owing to the leaf disease, great depression in the coffee plantations in Ceylon, but Usambara was waiting for the planter; and here and there the natives had the coffee plant, showing that it would grow in that district. From what he had read, he

believed that tea, cinchona, and (cocoa might also be grown there. For a great part of the distance the difficulties of transport might be overcome by following the Luvu and Zigi * rivers, one running to Pangani, and the other to the Bay of Tanga. The latter was a great harbour capable of receiving nearly all the merchant ships that ever went to the east coast. When he remembered that here was a rich and fertile country within thirty miles of the coast waiting for cultivation, he could not but think that in a few years' time it would be opened up. Then the beauties of Kilima-njaro would be brought within reach, and he hoped that before he finally left Africa he should be able to welcome Cook's personally conducted tours to the heights of Kilima-njaro.

The Rev. CHAUNCEY MAPLES expressed the delight with which he had listened to the paper. Missionaries in Africa were always thankful when such men as Thomson and Johnston visited the country. They treated the natives well, and therefore they were the kind of travellers that the missionaries approved of. Mr. Johnston had spoken of being taken for a ghost, and he himself had often been taken for a ghost in Africa, but he had never been able to persuade the people that he was not a ghost by the mere exercise of his voice. The way in which he convinced them was by calling for food, for the native African idea of a ghost was a thin shadowy creature that could not eat. He could remember several occasions on which he had quite disabused the people of the idea that he was a ghost by making a hearty meal at their expense. He had never travelled so far north as to see Kilima-njaro, but when he was in the south of the Rovuma he heard about a snow mountain. He was glad to say that Mr. Thomson had visited his mission station. The news that he heard about a snow mountain had not all been really corroborated, but Lieutenant O'Neill had seen the Namuli Peaks. It was not a mountain of the size that he had been led to expect, and he did not know that it could take rank as a snow mountain. He had been particularly interested to hear about the hyrax and other animals, traces of whose existence had been found at such high altitudes. The common hyrax of which Mr. Johnston spoke was the coney of Scripture, where they were described as "a feeble folk," which made their house in the rocks. At his own station he had often heard them crying out from rock to rock, and he had peered into their holes in the granite crags. He thanked Mr. Johnston for speaking well of Mandara; he had not had the pleasure of meeting that chief, but he knew another chief whom he considered the most remarkable man he had ever met with in Africa, and to whose goodness and disinterested kindness he owed the fact of being able to be present at that meeting, for the chief saved his life. Mr. Thomson had spoken well of the same man, and his name was Matola. There were good and true men in Africa who only wanted to be treated kindly and justly by Europeans to prove to the world at large that they really were a very fine set of men. On behalf of the Universities' Mission and other missions he thanked Mr. Johnston for his valuable paper.

The PRESIDENT, in moving a vote of thanks to Mr. Johnston, said the Society had seldom listened to a more graphic or interesting paper, bringing before them as it did, not only the scenes, but the men among whom he had lived. The only drawback to his pleasure was that in the present acquisitive mood of the world he was afraid that after hearing such beautiful places described as Taveita and the slopes of Kilima-njaro an expedition would be sent out from some country or other

* The Luvu runs from Kilima-njaro to Pangani, the Zigi from the heart of the mountains of Usambara to the Bay of Tanga. The natives always say "Luvu," but the Arabs having no *v*, always change *v* into *f*, and they generally change *L* into *R*. No native ever speaks of the "Wakwafi," always the "Wakwavi."—J. P. F.

to take possession of a district which to the rest of Africa was very much like the Lake district of England to Londoners. In Mr. Thomson's book there would appear a delightful description of this paradise of Taveita. It was true that Mr. Thomson approached the region across an arid desert, where the sufferings of himself and companions were very great; but the approach to it along the longer route from Pangani took the traveller by the side of rivers, and compensated for its greater length by a very sensible diminution in his sufferings.

Afghan Boundary Commission; Geographical Notes.

By Major T. H. HOLDICH, R.E.

II.

The Helmund.—Kwaja Ali, where the Boundary Commission first struck the Helmund, exists only in name. The ruins of one solitary mud tower, so near the edge of the river as apparently to be included within the limits of its bed at seasons of flood, alone testifies to the former existence of any village or fort. The bed itself in the month of October was hard to define. The actual width of the river was not more than 100 yards, but the fine white silt which bordered it extended to a width of about a quarter to half a mile on its left bank, and is doubtless at times all under flood. The river was fordable for unladen camels at Kwaja Ali itself, and under ordinary conditions fords can be found at intervals anywhere below Kwaja Ali. Thick clumps of tamarisk varied by the Euphrates poplar are a familiar feature throughout the course of the river, but at Kwaja Ali in particular the tamarisk was unusually fine and prominent. The valley is narrow. A sharp definite ridge on either side defines it—ridges of clay or sandstone hills, pebble-covered, and soft. The width from crest to crest varies from three to five miles. These ridges shelve down to the river with the universal sweep of glacis-like plateau so common throughout Afghanistan. These rolling plateaux (called *dasht*) afford about as good ground for travelling over as could be wished for. There was no struggling along an uneven boulder-covered clay river-bed anywhere. It was all straight and even going across the dasht at the foot of the glacis sweeping down from the hills. So far the view within the valley itself was limited, but when the ridges gradually increased in altitude to some 300 feet, it seemed probable that by gaining the summit of some of the more prominent square-cut bastion-like masses into which these boundary ridges were occasionally broken up, a wide view might be gained across the open desert land which stretched away from either bank. This was an utter delusion. Some four or five miles back from the valley on either hand was always another ridge—or rather another step in the vast desert hiding the distance from view like a wall—and from the summit of this again one only looked across a gently falling sweep of open plain to be confronted with another step at almost

an equal interval. It is not to be supposed that these steps are absolutely regular in their conformation, nor strictly parallel to the river course; but there they were, and after passing Rudbar where the far away distant Beluchistan peaks were last visible, no hill broke the horizon line again till reaching Kala Fateh. It was one vast desolate desert unrelieved by a single prominent feature.

But the valley of the Helmund itself is full of interest. From Lundi onwards to Kala Fateh one rides through and over the relics of dead kingdoms. The remains of forts, of deep-cut irrigation canals, of pretentious habitations that might have been palaces, still grimly holding their own whilst the surrounding villages have entirely disappeared, are the common features of the landscape. Broken pottery strews the way sometimes for miles at a time. But there is one rather remarkable feature common to all these ruins alike, as far as Kala Fateh, which is that they are all built of mud or of sun-dried bricks. Just once, when entering the fort or palace called "Kala-i-madre-i-padshah," about 12 miles beyond Rudbar, did I observe that I was crossing the brick (burnt brick) foundations of some building that had entirely disappeared. The fort and citadel of Kala Fateh too is founded on brick, although the entire superstructure is mere mud. The river widens after passing Rudbar, but still keeps to a well-defined channel as far as Kaju, where there is a very indifferent ford. The low sandy soil adjoining the right bank between the river and the dasht is here cultivated by means of very deep irrigation channels which can only be crossed by bridges, but there is ample room on either bank for a good road down the valley on the dasht at the foot of the hills. Chahar Burjak commands a much better ford than the one at Kaju, where the river is narrow but of uncertain depth. Leaving the valley on either side and ascending the ridges which bound it, very much the same appearance of limitless plain is encountered. But the field of view is not really large. The plains fall towards the river in vast steps, so that from the first ridge surmounted the next great step cuts off the horizon at a distance of from 5 to 15 miles, appearing like a ridge of hills in all respects similar to those just ascended. There are no hills in either case—merely the consecutive steps (from 200 to 300 feet in height) of a vast plateau sloping down to the Helmund basin. Another curious feature is the apparent absence of small local tributaries to the river. No opening is ever apparent in those square-cut sandstone cliffs, and it is not easy to say what becomes of the collateral drainage. The rainfall is doubtless very small, and from the observations that were made by the surveyors, who constantly ascended the cliffs bounding the valley, in the vain hope of catching a glimpse of some distant peak either to the north or south, the phenomenon of the Helmund itself disappearing into a vast swamp is repeated on smaller scales all through the country. In the case of the Helmund the swamp is never entirely dry, but in these minor instances

probably the rainfall disappears very rapidly. Considering the distance the Helmund water has to travel, the absence of tributaries on its lower course, and the absorption of water for irrigation, it is a matter of surprise that so much remains as we subsequently saw in the Hamún, or swamp, where its course is ended.

Turning northward from Chahar Burjak, it was not till we reached Kala-i-Fath (or Kala Fateh), by far the most remarkable place we had yet visited, that our eyes were gladdened again by the sight of distant hills on the Persian frontier. It can easily be imagined what assistance well-marked hills afford to the progress of a geographical survey.

From Chahar Burjak to Kala-i-Fath the road passes over low spurs of the plateau on the right bank, instead of following the bed of the river, and there were many signs that we were passing over what must once have been the river bed itself, notwithstanding its present elevation. The imposing mass of ruins which Kala-i-Fath presents denoted a former stronghold of far greater importance than any we had previously seen standing above ground. What may be buried beneath the surface it is of course impossible to say. The citadel still towers high above the crumbling mud walls of the fort, and if the sarai adjoining the fort, with its central domed roof and two enormous wings, is in any proportion whatever to the former traffic of the country, it proves that there must have been a considerable amount of trade passing along this route even in comparatively recent periods, possibly long after it ceased to be the capital of the Kaiani kings. The fort walls are about two miles in circumference.

Northwards from Kala-i-Fath the geographical features of the country present little variation from a view of endless plain, bounded on the far west by the Persian frontier hills. The road passes along the river bank, and occasionally dips into a dry part of the river bed through thick undergrowth here and there of tamarisk and wild caper. The most prominent tree (in fact the only few trees we saw) in this district is the Euphrates poplar. From Kala-i-Fath past the camping ground at Padh-i-Sultan, the great point of interest in the landscape is the enormous area which is covered by ruins. Dotted over the wide plain as far as the eye could reach were the last fragments of what appeared to be dwelling-houses, built high and square, and with some pretensions to comfort and appearance. But the terrible north-west winds had swept for ages over and past them, silting up sand drifts in the interior, and almost polishing the north-west angles with its persistent blasts. I have never felt anything like those Seistan winds in November. For severity and cutting intensity a north-easter in England is by comparison a gentle zephyr. The Kohuk band (or dam) across the Helmund and a Persian outpost were passed between Padh-i-Sultan and Deh-i-Kamrán. The band is a simple mud and wattle construction, but it was possible to cross the river on it.

The next march again took us over innumerable mounds still covered with burnt bricks and tiles, which might almost be called a prevailing geological feature. Nadali fort, standing high on a remarkable mound, and faced by one or two of similar appearance, gave rise to some speculation. Are these mounds natural or artificial? They stand about 50 to 100 feet above the surrounding level of the country, and they have all of them at one time or another been surmounted by some defensive construction. If they are artificial, it is difficult to account for the utter absence of any appearance of former excavations from which such huge masses of earth must have been taken. If natural, they are certainly most curious features in the country. Geological scientific opinion inclines to the "natural" view. In some instances there is the direct evidence of stratification in them—but not in all. The mounds which have been sites of former towns and villages, on the other hand are obviously composed of débris which crops up to the surface and betrays the existence of some sort of construction beneath. But this is hardly a geographical question. The general desert nature of the country so far changes considerably about this point. Thick tamarisk jungle growing to a height of 30 or 40 feet, with occasional stretches of excellent grass, were in delightful contrast to previous experiences. Dates and water-melons here too began to find their way to camp, and from that point to this (near Panjdeh) the melons have gradually increased in excellence till I think it may be fairly said of the Turkoman fruit that it is unsurpassable. We were now approaching a well-cultivated, well-inhabited land—cotton, wheat, and barley were abundant; the people (the Belooch tribes—Sinjaranis principally—had given place to Tajaks) were friendly but afraid; good water was abundant everywhere, and life began to be pleasant again as well as interesting. Still the country remained flat and difficult to survey. Close traversing, checked by daily observations for latitude, azimuth, and rounds of horizontal angles to such distant hills as were visible, were all that could be added to the topography—which was necessarily narrow for want of points of sufficient command to overlook the country. Nor was the actual mapping a matter of so much importance, inasmuch as the Seistan boundary commission had already previously settled the topography of much of Seistan under far more favourable conditions. Our chief efforts as far as Jowain were directed towards preserving a strictly accurate geographical position in latitude and longitude. Past Jowain new country was entered. There fortunately opportunity was afforded by the presence of hills for carrying on a rapid system of triangulation, combined with astronomical checks and traversing, which has never since been dropped. It is now well on its way by more regular procedure towards Maimana, and will we hope ere long close on the well-remembered Hindu Kush points north-west of Kabul.

From Hamún to Herat.—From Ibrahimabad to Takht-i-Rustam the road follows the right bank of the river, and skirts the eastern edge of the gigantic Hamún which is its last resting-place. The Takht-i-Rustam is not an imposing feature. From 200 to 300 feet above the plain it rises in a small well-defined peak from the sandstone cliffs bordering the swamp, and owes its importance in legendary history to the fact that there happens to be no other peak like it in its neighbourhood. From the Takht, however, a grand view is obtained over the lake, which in November can be seen from behind its thick and wide belt of reeds stretching away to the horizon. A Seistan north-westerly gale was blowing when I overlooked it, and its dark deep green and indigo coloured waters were driven along in white-tipped waves as far as the eye could reach. From Takht-i-Rustam to Jowain the journey was made on one of those bitter blinding days of wind and dust that prevented anything like accurate observation. A wide open grass plain, covered with ruins standing up white and ghastly in the dust-coloured atmosphere, and the outskirts of a large thriving town (Jowain), with the close-packed, mud-built, dome-topped houses of Western Afghanistan, were passed and left behind, before the camping ground was reached on the bed of the Farah Rúd. There were signs here of our unpopularity in the country (about the first signs we had observed), and it was thought well to avoid Jowain. Lash, as seen from the Jowain side of the river, is an exceedingly picturesque town, built close on to the edge of the cliffs which form the right bank of the river, and giving some idea of defensive strength. It was only a passing glimpse that we obtained of either. From our camp on the bed of the Farah Rúd the great interest of the geographical work began; for before us was an absolutely new route; through country of which little or nothing was known. It may be as well to give the camping-grounds and distances. First march to Kushk Rúd, $17\frac{1}{2}$ miles, a narrow valley, bright green, with thick grass and a plentiful supply of water. We rose from the Farah Rúd on to an open plateau covered with small stones and gravel, very similar to the dasht of the Helmund valley. Wherever met with, it affords excellent "going." Kushk Rúd to Kila Kén, about 14 miles of easy marching to a village in the open plain, where supplies and water were plentiful. Kila Kén to Kila Kung, about $21\frac{1}{2}$ miles. We turned the corner of the Galai Koh range here, and from this point passed through a succession of open valleys bounded by narrow but very steep ranges of trap and limestone (very similar to the conformation about Kandahar), by roads which were good on the whole, but occasionally obstructed by the very deep irrigation canals drawn from the Farah Rúd. From Kila Kung to Zehgin was a march of about 20 miles, still through open ground bordered by hills which crossed the general direction of our route (north-west) about at right angles. All this country is fine, open, fertile land, reminding

one much of Pishin. Much of it is cultivated, and where this is the case, the villages, though at wide scattered intervals, are large and flourishing. They are all surrounded by walls with mud towers at the flanking corners, after the universal pattern of Afghanistan. It may be mentioned about Zehgin that its position, as marked in the Turkestan map, is approximately correct. This is curious, as the average error in longitude of most points that have been identified is very considerably to the east.

From Zehgin to Sangbur—17 miles—passing through the Anardawa gap in the narrow range on our left. There is no pass or kotal; the Anardawa river makes its way through the hills, and affords a natural highway. The village of Anardawa is snugly placed on either side the river within the hills, and was a curious contrast—with its well-built, well-kept houses, neatly constructed walls enclosing gardens and orchards of apricot, almond, and pomegranates, and its well-to-do appearance—with anything we had seen before. A curious feature about the place is the blast of intensely cold wind which faced us as we passed through the gap, and which was noticeable half a mile before reaching the entrance, but which disappeared on the north-west side of the hills. Advantage is taken of this for the working of innumerable windmills of a pattern new to me. A vertical shaft has four projecting wings, or sails, which rotate horizontally between two walls which are built parallel to each other, so as to form a tunnel in the direction of the prevailing wind. The wings were about three or four feet broad, and about ten feet high, usually made of coarse matting. The grinding power of these mills, judging by the rapidity of rotation, must be enormous. Country-made boots (of sheepskin with the wool on) were obtained at Anardawa. From Sangbur, a longish march of 22 miles, takes one to Karez-dasht, where there is water sufficient for a small force. The road passes through (not over) the Jumal Ghazi gap, which can in no sense be called a pass, although a main watershed is crossed some distance after leaving the hills. The rise is exceedingly gentle and easy, up an open nullah very similar to the lower stages of the Bolan or Khojak passes. Jumal Ghazi is a fine peak (as peaks go in this part of the world—and they are not wanting in rugged grandeur if they are in altitude), and is an excellent landmark for many marches. This is probably the “M' Kaiser” of the Turkestan map, but no such name was identified. Passing on from the insignificant fort of Karez-dasht, 10 miles brings us to Mangal, within sight of the hills overlooking Sabzawur, but out of sight of the town itself on account of those very hills. There are large villages between Mangal and Sabzawur, and a good deal of cultivation. It is all open plain, bounded by rugged and sharp-edged hills, which here contain granite, giving them a singular deep red and purple appearance in the clear evening atmosphere. The extraordinary

effects of refraction were never more marked than at this place. The walled villages stood up high as vast citadels and fortifications, and it was really not easy to determine their nature. The next march to Sher Bakah was over the waterless plain and up to the northern watershed of the valley—a long march of 23 miles over a perfectly open plain, covered with the same small scrub of camel-thorn and many nameless but thorny varieties of the genus “bush.” Sher Bakah possesses a nice little spring of clear good water. It is a green little spot just below the watershed, which falls gently to it. Here again we passed over that open variety of watershed, with an ascent so gentle as hardly to be noticeable, and a descent which might perhaps be called steep for some 20 yards or so, which is so common in Afghanistan. It is a mistake to call these gentle ascents and descents by the name of “pass.” They are better classed as “open kotals,” there being no English word to represent them. And here it may be remarked that while the well-known word is pronounced kōtal throughout Northern Afghanistan, it is distinctly called kotēl in this part of the world. The next march was a little trying. Thirty-eight miles over and amongst perpetual sand-covered rolling lines of low hills, crossing one narrow little valley after another, and winding in and out in a maze of small hillocks, till we reached the pleasant little oasis of Chahgazak. Here at last we had a friendly reception, and were glad to have put 60 miles of something very like desert between us and our Noazai and Atohakzai friends about Sabzawur. Here we met the first Turkoman in his Turkoman hat. In a very short time he was immensely popular. We were now within the limits of a country which has suffered much from Turkoman raiders. From Chahgazak to Pahre, 17 miles over a rolling stony plateau, and in and out of small ravines, on to an open, partly cultivated plain, with Pahre nestling closely under the opposite hills. From these hills—spread out in a wide open plain to the east, dark here and there with thick lines of fruit-trees, whitened here and there with long lines of bastioned walls lit up by the western sun, with the glint of minarets and the curious patchwork of light and shade which denote a great city—we can *at last* see Herat.

Letters from Colonel Prejevalsky.

The following letters, giving interesting information regarding the progress of the Tibetan Expedition, were written by Colonel Prejevalsky to H.I.M. the Czarewitch, and published in the *Invalide Russe* of the 4th January (new style):—

IDOL TEMPLE OF CHOBSEN, PROVINCE OF HAN-SU,
March 10th, 1884.

We left the town of Urga on the 8th of November last. The caravan consisted of 21 men, 56 camels, 27 saddle horses, besides a small flock of sheep destined for our provisioning on the way. We had accumulated a very large amount of baggage (about 300 poods), as we are obliged to take with us all necessaries down to the last trifle. The detachment was placed on a war footing; all rode with Berdan rifles slung over their backs and revolvers in their belts; watches were kept in turn night and day; inexorable discipline was maintained. All this was absolutely necessary, our strength lay in our watchfulness; the Asiatics would in all probability never venture to attack us openly.

Immediately beyond Urga the fertile, well-watered region of Northern Mongolia, abounding with meadows and forests, comes to an end, and the mighty Gobi lies stretched out instead—that desert which measures from west to east, from Panwi to Khingan, 2650 miles, and is about 700 miles wide from north to south. We had now to cross this desert just where it is widest. The northern part, three degrees of latitude from Urga, is still composed of steppes, covered by excellent grass, giving pasture to antelopes and innumerable herds belonging to the Mongols. Then you come to the real desert, Central and Southern Gobi. The first of these consists of perfectly bare flat spaces covered with pebbles, cut up at intervals by low stratified ridges, likewise barren. Southern Gobi is covered all over with quick-sands, the remains of shoals and dunes of the once wide Central Asian sea.

Terrible frosts in winter, without snow; almost tropical heats in the summer, with frequent storms, more especially in the spring; want of rain, and the consequent absence of lakes and rivers; finally, an extreme general barrenness—such are the characteristics of the Central Asian desert. Nevertheless, the Mongols inhabit all parts of it, and their flocks and herds manage to subsist on the poorest fodder; in return for which, however, they are free from the winter imprisonment and tiresome summer insects of our climes. The flora and fauna of the desert show very little variety, as might be expected from the monotonous physical conditions of the country.

At first, too, Gobi gave us an unfriendly reception. The frosts at night exceeded sometimes the freezing point of mercury, and by day, too, it was generally cold enough, particularly when there was a wind. It is true that further south it became somewhat warmer, but here fodder was almost unobtainable for our beasts of burden. Lucky it is that the camel can go several days without food and suffer hardly any diminution of strength, and is contented, in general, with the most miserable rations. Even the horses of the desert are accustomed to all its inconveniences, and trot along beneath the riders whole months in places where our spoil animals would not survive a single week.

The days of our journey through Gobi passed slowly and monotonously. At sunrise we loaded our camels, and having marched an average $13\frac{1}{2}$ or $16\frac{1}{2}$ miles, bivouacked near some well; or if such was not to be found, took with us a supply

of ice from our last night's resting-place. For fuel we used the dry dung of animals, which we collected in the neighbourhood of our halting-places. Such fuel burns pretty well, and the felt tents become sufficiently warm; without fire the temperature in our dwellings by night went down to 26 degrees of frost Celsius (-15 Fahr.).

The Khurkhu ridge forming the eastern edge of the Altai, and stretching diagonally from Lake Zaisan almost to the northern bend of the Yellow River at Ordos, served along our line of march as the boundary between the central stony Gobi and the southern part known by the name of Alashan. This region is almost entirely covered with sand strewn over a firm substratum of clay, and at places of stone, and blown up by the wind into numberless shifting hills 50 to 100 feet high. There is no water, and, as in Central Gobi, vegetation is poor in the extreme, birds and beasts are very few; often enough there is nothing but naked sand for tens and hundreds of versts. But in spite of Nature, who is here a very stepmother, the Mongols wander in places. In the western part of Alashan, where the range of that name runs like a great wall separating the desert from the cultivated banks of the Yellow River, is the town of Din-yuan-in, or, in Chinese, Fou-ma-fou [Wei-ching-pu?], the residence of the local ruling prince. I had made the acquaintance of him and his two brothers in my former journeys, so that the princess gave us a fairly good reception, though, as before, they were not ashamed to importune me every day for presents, not omitting bits of soap, penknives, and such-like trifles.

Resting a week at Din-yuan-in, whence I sent news of the expedition through Peking to St. Petersburg, on the chance of its arriving, we set out for Tibet. We had only 200 miles of desert to traverse, which we got over without mishap. In the distance, more than 66 $\frac{1}{2}$ miles away, we could see before us the towering mountain slopes of Tibet—that is to say, its advanced spurs on the side of Gobi. These mountains, at first under the name of Nan-Shan, then Altin-Tag, Tugus-Daban, and lastly Kuen-Lun, stretch in one unbroken wall from the Upper Hoang-ho to the Pamir. Everything here, as usual in Asia, is on a gigantic scale. The ridge above-mentioned was not more than 20 miles wide where we crossed it, yet behind it lay quite another world from what we had seen hitherto. The absolute height of places we passed, which until now had alternated between 3500 feet and 5000 feet, suddenly rose to 9000 and 10,000 feet. Instead of shifting sands, barren and waterless, we came across numberless brooks and rivers, a fertile soil, a rich flora and fauna. We were entering now the limits of the Chinese province of Kan-su, and throughout February, which we spent in these mountains, we repaid ourselves almost, especially in the matter of zoology, for the time involuntarily wasted in the Desert of Gobi. We hunted whole days in the magnificent forests of Kan-su, and enriched our collections with many splendid specimens of birds and beasts.

We are now staying near the Idol Temple of Chobsen, 33 $\frac{1}{2}$ miles to the north of Sining, where we must necessarily make various purchases before continuing our journey to Tibet. We shall go there in a day or two, through Koko Nor and Tsaidam.

In the latter, at the foot of the mountains Burkhan-Buddha, we shall form a depôt, where we shall leave all spare camels and baggage, under charge of five Cossacks. We ourselves, to the number of sixteen men, in light marching order, shall start for the source of the Yellow River, and on through Eastern Tibet, if it prove possible. I calculate upon spending the spring and summer, till August, in these regions, which are utterly unknown to science. Then, after returning to the depôt, I shall go either to Lhasa, if the Tibetans agree to let us pass, or, which is much more probable, to Western Tsaidam; and having established a new depôt at Gast, employ myself in exploring Northern Tibet.

EASTERN TSAIDAM, August 8th, 1884.

In the middle of March last we left the mountainous district of the province of Kan-su, and took to the plateau of Lake Koko Nor. The absolute height of the spot was 10,800 feet. The forests had disappeared, and had been replaced by meadow-like steppes, affording excellent pasture for domestic cattle, alongside of which roamed large herds of antelopes and wild asses, or khulans. The ground was honeycombed with the numberless burrows of the marmot. These little animals, which are also very abundant in Northern Tibet, very often lay waste large districts by their constant burrowings and devouring the roots of the grass.

The lake Koko Nor itself, wide (166½ miles * in circumference) and very beautiful, was still covered with ice, although we were at the end of March, and now and then the days were warm; much more frequently, however, cold and snowstorms prevailed. The ice on the Koko Nor broke up only at the beginning of April, and threw huge masses upon the shores, where the ice lies, according to the natives, until the beginning of May. Birds of passage, and even water birds, do not remain in any numbers here, in consequence of the length of time during which it is ice-bound, and the absence of suitable places for nesting and food (reed-beds, bushes, &c.); they hurry on without a glance to the more convenient regions of Russian Siberia. The fish in the lake are numerous, but there is no great variety. The inhabitants of the surrounding steppes are Mongols and Tangutans. The latter oppress the former cruelly, often in company with robber bands from Tibet. It is very probable, indeed, that in no long time the Mongols of Koko Nor will be exterminated altogether by the Tangutans, and the same fate awaits the Mongols of the Tsaidam, the country lying to the west of Koko Nor. Tsaidam is a vast salt-marsh basin (533½ miles by more than 67 miles), which was at a comparatively recent geographical epoch the bed of a mighty lake. The absolute height falls here to 9200 feet. The climate, therefore, is warmer than at Koko Nor. But the air is always filled, as with smoke, by clouds of dust, blown up by the wind from the saline surface, which is often quite bare, and at the best covered with bushes of tamarisk and kharmik (*Nitraria Schoberi*). The latter plant is of great importance to the inhabitants of the Tsaidam, for it furnishes in the autumn an abundance of little sweet berries, in appearance something like our currants, upon which the local Mongols feed.

At the beginning of May we reached the foot of the mountains Burkhan-Buddha, guarding on the side of Tsaidam the lofty tableland of Northern Tibet. Here began a new phase of our expedition. We left all unnecessary camels and baggage in East Tsaidam, under charge of seven Cossacks, and set out, to the number of fourteen, for the source of the Yellow River, and the southward, according to opportunity.

We were three days climbing the ridge of Burkhan-Buddha, the pass through which is 15,700 feet high; its descent on the other side is much shorter; for there lies already the tableland of Northern Tibet, which is itself no less than 14,000–15,000 feet above the sea-level, and occupies a vast space abutting on the prairies in the west, the North Himalaya in the south, and the chains of China Proper in the east. Upon the tableland and in its eastern division lie the sources of two famous Chinese rivers—the Hoang-ho and the Yang-tsze-kiang. In spite of the attempts made by the Chinese, before the Christian era and again last century, to explore the sources of these rivers, they never succeeded. And, indeed, Northern Tibet in general up to the latest times has remained, and even now in part remains, a region quite unknown to geographers.

* In his former work Colonel Prejevalsky stated the circumference at from 200 to 230 miles. But this was an approximate estimate.—'Mongolia,' ii. p. 140.—[Ed.]

Crossing the Burkhan-Buddha, and continuing about 67 miles further through the desert tableland, we reached at last the wished-for goal, the source of the Yellow River. It is formed at a height of 13,600 feet by two streamlets, flowing from the south and west, out of the mountains scattered about the plateau, and is fed by numerous springs of the wide marshy valley (40 miles by 13½ miles) known by the name of Odon-tala, known to the Chinese as *Sing-su-hai* or starry sea. The Hoang-ho, or Yellow River, itself is here a very modest stream, consisting of two or three branches, each 12 to 15 fathoms broad and two deep at fords, and at low water generally. After a course of about 14 miles in this fashion, the Yellow River falls into a wide lake, the southern shores of which it colours with its muddy waters, then pouring out of it to the east soon enters another similar lake, which it leaves already a considerable river; further on, having made a sharp bend to get round the ridge of Amne-machin, covered with everlasting snow, its mad current tears through the cross strata of the Kuen-lun and flows towards the boundaries of China Proper.

Hardly had we entered the mountains of Northern Tibet when we found a terrible climate. Though it was the second half of May, wintry snowstorms were not unfrequent, and the frost by night reached -9° Fahr. Nevertheless, the coarse grass did not perish, and after the keen frost the sun revived the scanty flowers. But not only in May, but in June and July, there were frosts (23° Fahr.) every clear night, and it rained nearly every day, sometimes many days running. The amount of moisture brought here by the south-west monsoon from the Indian Ocean, from beyond the Himalayas, is so great that in summer Northern Tibet becomes almost one vast bog. It is unnecessary to describe how difficult it was for our laden camels to get through these bogs, and how injurious the humid, cold climate was for those animals, accustomed to warmth and dryness.

But the savage desert of Northern Tibet, so inhospitable to man that throughout its greater part even nomads refuse to tarry, is covered with numerous herds of large animals—yak, wild asses, antelopes, mountain sheep, and even bears. In spite of the want of woods, bears are very numerous here. We met several every day, sometimes as many as ten, and killed some thirty specimens. This bear is very cowardly, and even when wounded runs away—only the mother with cubs sometimes attacks the hunter.

Having spent some days at the source of the Yellow River, we went southward towards the Blue River or Di-chu (the Yang-tze), as the local Tangutans call it. The country, as before, was a hilly, sometimes even mountainous, plateau, for the most part covered with hillocky bogs, overgrown by the Tibetan reeds, stiff and hard as wire. The watershed between the two great Chinese rivers was 14,500 feet high at the spot where we crossed it. Further south, in the basin of the Blue River, the character of the ground changes rapidly into an Alpine country, where the herbal flora becomes sufficiently rich and varied. Here wander with their flocks of goats and sheep the Mongols of the tribe of Kam. They received us not very hospitably, but still not as enemies.

After an arduous journey of 67 miles through the mountains, we reached the banks of the Blue River, here at an altitude of 12,700 feet. Hemmed in by the mountains, the river has a width of 50 to 60 fathoms, the water is very muddy, the current extremely rapid, and very deep. It was impossible for us to ford such a river with our camels, so that we could not continue our journey to the south. We determined, therefore, instead, to explore the great lakes of the Upper Hoang-ho. But we spent a week on the banks of the Yang-tze first, making excursions in the neighbourhood. On one of these excursions the Tangutans fired at us several times from the opposite bank.

Returning by our former path to the basin of the Yellow River, we took a new route to its lakes. We found the way by scouting, as we had no guide. We met no inhabitants, but the nearest Tangutans followed us all the same, and at length, at daybreak on the 13th June, made a sudden unexpected attack upon us to the number of 300 horsemen. Stealing up in the dark to our bivouac, the horde dashed upon us with shouts. Luckily we were already awake, and speedily prepared for defence. First rang out the single shot from the Cossack on guard, then a second and third—and the rifles rattled away merrily. Our little bivouac was instantly surrounded with a line of fire. . . . The robbers, thinking to take us by surprise, could not stand our fire, and promptly turned back. We accompanied their flight with file firing and volleys, till they were out of range. Then loading the camels we made for the Tangutan camp, attacking them in turn and putting them to flight. After this encounter we took greater precautions than before, but continued our route along the lakes, which by right of discovery I named Russia and Expedition Lake. They both lie at a height of 13,500 feet, surrounded by mountains; they are very beautiful, and each is more than 80 miles in circumference. Fish are abundant, but again there is no great variety. Of water birds only Indian geese are numerous. Once we came upon a vast flock in a little neighbouring lakelet, and three of us in an hour and a half killed 85.

Six days after the first encounter a second attack was made upon us by another Tangutan tribe, the most renowned robbers of the Yellow River, and this time by day, the band numbering again about 300 horsemen. Coming down the nearest mountain, and riding up at a trot from a distance of nearly a mile, they rushed to the attack with yells. The hoofs of their steeds sounded hollow on the damp soil, their long spears bristled and glistened, their long cloth robes and black floating locks streamed behind them on the wind. Like a cloud this savage, bloodthirsty horde dashed upon us. Every moment the outlines of the horses and horsemen grew more distinct, and against them in front of their bivouac silently with rifles ready stood our little handful of men, fourteen in all, for whom there was nothing now but victory or death. When the distance between us and the robbers was no more than 500 yards, I gave the command "Fire!" and the first volley sped: then followed a rapid irregular fire. The first volley did not stop the enemy; they continued to gallop towards us, their commander crying, "Charge, charge! God is with us! He will help us!" But when horses and men began to tumble before our fire, the robbers turned their steeds aside and hid themselves behind the nearest rocks. Then they dismounted and opened upon us with their flint-locks at 300 yards. So I left in charge of the bivouac my lieutenant, Robarofsky, with five Cossacks, and with the other seven started to drive the Tangutans from their cover. They fired at first at short range, but hit no one, and as soon as the first of us climbed the rocks the Tangutans made for their horses in hot haste and fled. We kept firing as they retreated, and killed several more. But as usual they carried off their killed and wounded companions with them; only seven dead horses and one or two men remained whom they were unable to carry off; the valley was strewn with cloth cloaks and hats which they had lost in the confusion of flight. The robbers, after being driven out of their first caves, took station behind the rocks and again opened fire upon us, but were driven out again with equal success. A part of the band meanwhile, supposing their own bivouac remained unprotected, attacked it, but were driven off by the fire of the people left there. Then the Tangutans, unsuccessful at all points, began their retreat to the mountains. We fired volleys at them while within range. We killed and wounded altogether in both fights forty men and many horses. We ourselves, by great good luck, suffered no loss beyond two horses wounded. The firing only ceased at dusk. We watched all night, sitting on two

mounds at either side of our bivouac. Unluckily, the weather became very bad ; rain fell ceaselessly ; a strong, cold wind blew, and the darkness was impenetrable. However, the Tangutans had met such a reception that they could not make up their minds to attack us again, although a night attack would have given them many advantages, saving them from the deadly effect of our rifles, at least at a distance.

Our return journey from the lakes of the Yellow River to Tsaidam was not marked by any particular adventures. We were harassed only by the frequent rains, and, in spite of its being the end of July, occasionally wintry snowstorms. Through the Yellow River we passed very successfully, for the water had fallen only the previous day. We met no more Tangutan robbers. Only not far from the southern foot of the Burkhan-Buddha we met a peaceable party of some thirty men occupied in gold-washing. Gold is very plentiful throughout Northern Tibet. At the diggings we visited the Tangutans went no deeper than one or two feet from the surface, and the washing was of the most primitive description. Nevertheless, they showed us whole handfuls of gold in lumps as big as peas, and often twice and thrice as big. Without doubt, with more careful working, vast treasures would be found here. I believe, on the whole, that I shall not be over bold in predicting that in the course of time Northern Tibet will become a second California, perhaps even richer than the first in precious metals lying in the soil over the vast surface of the desert table-land.

Crossing the Burkhan-Buddha once more, we went down into the plain of Tsaidam, which now seemed to us, after the horrors of Tibet, a favoured land in spite of its hideousness. We have now to visit Western Tsaidam, where we shall form a new depôt at Gast, and occupy ourselves with the exploration of the surrounding country during the winter.

*Recent Dutch Expeditions to the North Coast of New Guinea and
Ascent of the River Amberno.*

THE well-known Dutch geographer, Mr. Robidé van der Aa, has recently published * an account of two voyages to the north coast of New Guinea, undertaken by Mr. D. F. van Braam Morris, Resident of Ternate, in 1883 and 1884.

The chief points of interest recorded may be summarised as follows:—

On the earlier voyage (in the steamer *Sing Tjin*), the first place visited was the Mapia group of islands, which lie about $1\frac{1}{2}^{\circ}$ N.E. from Dorei, in E. long. $134^{\circ} 23' 9''$, and being nearer to New Guinea than to any other land, is considered by the Dutch to belong to them. The population consists of the remains of an aboriginal population, nearly all killed by the Gébé people, and of immigrants brought in by Europeans for the trade in coco-nut fibre from Yap (Carolines).

The *Sing Tjin* proceeded thence to Jamma (Tastu), a small island west of Walckenaer Bay, which, itself producing nothing, is the depôt for the coco-nut fibre collected on the mainland. The houses here are long and rectangular, with very high roofs, and built on dry land, and

* In the 'Bijdragen tot de Taal-, Land-, en Volkenkunde van Nederlandsch Indië,' 4th series, x. 1, 1885. The article has been kindly translated and abridged for us by Mr. Coutts Trotter.

not in the water, according to the more usual custom in New Guinea; * among them are a *karwar* house, or temple, built like the ordinary houses, but larger and of better construction, ornamented with arabesques in red and black, and containing male and female images, and bamboo flutes, like those found in a similar "temple" at Humboldt Bay.

About 25 miles south-east of Jamma is the mouth of a large river, the Witriwaai, not found on any map, † with hardly six feet of water on the bar. After rowing up the river for two hours the party reached a very large lagoon, where they were surrounded by some hundred boats full of men and women, very friendly and well-behaved, who urged them to visit their houses, which, however, were in the water and not accessible to the boat; but they were much pleased by a distribution of presents. The number of coco-palms along the river was astonishing. The copra trade seems to reach its highest activity here; 250 nuts selling for a *parang*, worth 60 cents. ‡ There was no current in the river, and no discoloration out to sea. The sea-going boats are eight to ten feet long, and just broad enough to sit in. In the middle, projecting somewhat on either side, is a deck on which those who have nothing to do sit. As the outrigger is very long and broad, these boats nearly resemble the outrigger craft of Polynesia. The river sampans are eight feet long, almost rounded below, and so narrow that the crew are obliged to sit on the gunwale. They have no outriggers, and thus are very crank, but the native seldom loses his balance in them. The women use broader and slower boats.

About eight English miles east from the Witriwaai is the river Wiriwaai, with a strong current discolouring the water far out to sea. Mr. Morris, accordingly, considers this to be the principal outlet, and the Witriwaai a former mouth of the same river. There was a heavy surf on the coast; the river is about 90 yards broad, and seven feet deep. The population here is thoroughly well disposed, and honest; the steamer's boat was half swamped in the surf and the contents washed out of her, but everything was fished up and brought back, even to the iron rowlocks, which must have the greatest value for them. §

In Sadipi Bay, nearly a degree further to the east, they anchored close by the village of Tabirap, in 35 fathoms. The bay is deep,

* According to Mr. B. van der Aa, *Jamma* is the island named by D'Urville after the botanist Mérat, while *Tastu* is properly *Massi*, and lies nearer the coast, between the islands Duperrey (Waké) and Mérat.

† This part of the coast is described on the French map as "mountainous"; but on Tasman's map, drawn up nearly two and a half centuries ago, we read that the land is low, thickly wooded, and judging by the water coming from it, full of great rivers.

‡ The islands Podena and Anoes, off the mouth of this river, are called by D. D'Urville, La Rénaudière, and A. Lesson. Van der Crab calls the latter Aroe, and incorrectly gives the name Padima to Jamma.—R. v. D. Aa.

§ The relative positions of the islands in Walckenaer Bay, as also of those further west, south of the Arimoa islands, require attention.

beautiful, and safe; its longer axis lies south-east. There is no level or swampy foreshore; the mountains rise very steep from near the water. The construction of the houses is again different from those in Walckenaer Bay. These are also long and rectangular, but the gables at each end have a penthouse roof of *atap*, which come so low down that a hole is made in them to enable the occupants to creep in. The floor is in the middle, along the whole length, higher than at the sides, and the end of the apartment is usually rounded like the stern of a ship. Some of the houses stand in the water, others on dry land. Here for the first time signs of agriculture are visible in the enclosures on the hill-slopes carefully fenced off. Sago is scarce, so that yams are much eaten. Here and there along the shore, but in deep water, are stages from which fish are speared. Tame pigs roam about the village, and are even taken in the boats like pet dogs. The language is related to that of Humboldt Bay, and two men joined the ship without hesitation as interpreters. The people were very friendly, placing both houses and wives at disposal, which were gratefully declined. The people of Sadipi Bay have as yet had little intercourse with strangers; they go, however, to Jamma, to barter coco-nuts, tripang, and tortoiseshell for iron. They are also on friendly terms with the hill people, who belong to a different tribe.

Tanjong Mer, the eastern point of Sadipi Bay, is a steep headland with reddish cliffs, the precipitous coast being formed by spurs of the Cyclops mountains, which are 3000 feet high, and lie at no great distance from the sea; the highest peak is called by the natives Doffon.

Between Tanjong Waimamaraoe, the east point of Walckenaer Bay, and Cape Bonpland, no rivers of any importance enter the sea.

At Humboldt Bay the party was much struck by the savagery of the people compared to those further west. They returned thence to the Amberno river. The most easterly mouth is very wide and easily distinguishable from the sea, although there is no discoloration of the water. There were two fathoms on the bar at high tide; within the mouth 9 to 19 fathoms. As there was no current, this is probably a branch of the river choked higher up. A second mouth lies somewhat to the east of Point D'Urville. From this the outward current was so strong that the surface water was sweet. By ascending the river with the boat, and drifting out again with the stream, which ran in a north-west direction, Mr. Morris found everywhere more than three fathoms, and thus discovered a channel in which there was sufficient water for the *Sing Tjin*, but the wind and sea had meanwhile risen and made the attempt impossible.

At Dorei they found a *korakora*, commanded by the Sengadji of Gébé, who was levying contributions on a pretended commission from the Sultan of Tidore, and the recollection of the old suzerainty of Gébé over this part of the coast induced the people to yield to his demands. Mr.

Morris, however, felt it his duty to carry him off to answer for his doings to the Sultan in person. The Rajas of Waigiu and Salawatti, who were suspected of similar practices, were also visited and cautioned.

Second Voyage, and Ascent of the Amberno River.—In the autumn of 1884 Mr. Morris again started (this time in the steamer *Havik*) for the Amberno.

North of Kurudu Island is the mouth of the Aiberan river, the water issuing from which is very muddy, and is seen sharply distinct for a long distance out to sea. The Aiberan is the only river of importance between Kurudu Island and Point D'Urville. Many other openings were seen in the low coast, but they are merely outlets from lagoons lying a short way inland. The most northerly mouth of the Amberno, where the channel was discovered in 1883, lies in $137^{\circ} 55' 53''$ E. and $1^{\circ} 25' 30''$ S. The channel was now found to be 800 yards wide, with five fathoms over two-thirds of the distance, the greatest depth being seven fathoms. It is very broad and straight, and at ordinary high water has nowhere less than four fathoms. The banks are low and marshy, and the water very muddy; the current about three miles an hour. The population of the few huts sighted fled at their approach, though every effort was made not to alarm them, and presents of knives, &c., were left in the houses. At last, at a small village called Pauwi, six hours' steaming from the mouth of the river, a few men were induced to approach, and the presents given to them brought out the rest of the population, but they declined to come on board until the interpreter had taken his place as a hostage in one of their sampans. The cattle on board made a greater impression than anything else they saw; and finding them harmless, their fears gradually abated, and they at last allowed themselves to be photographed. The population of Pauwi is of exactly the same race as the inhabitants of Geelvink Bay islands, and their *jidakos* and ornaments are of the same kind. They possess iron hatchets and European knives and other utensils. It is understood that they obtain these from the people of Kurudu Island, and that a creek, which they explained was navigable by sampans but not by the steamer, leads from the Amberno to the sea opposite Kurudu. The opening of this creek is two hours further up, below the village of Mawa.*

From Pauwi, in a S.S.E. direction, high land was seen about 20 English miles off, and on entering the hills next day the banks became higher, and the river somewhat narrower, but still with an average depth of six fathoms. The current, too, became stronger, and the bends in the stream sharper; the *Havik*, however, rounded the corners easily. But while passing along the western side of an island, the current became rapidly stronger, and the river suddenly shoaled to $2\frac{1}{2}$ fathoms. The captain stopped and allowed the vessel to drift down a little, and

* Lieutenant Kerkhoven in his map assumes that this creek joins the Aiberan; but there seems no sufficient evidence for this.

then steamed on at half speed, to look for deeper water at the other side of the river, but the current was too strong for the ship at half steam; she drifted out of the channel, and took the ground with her stern, swinging violently round with her whole length on a bank across the stream, which threw her almost on her beam ends, the current here running $4\frac{1}{2}$ miles. The bank appeared to be gravel, to judge by the sound of the stones as they washed against the vessel. Here they remained in considerable danger, until, after having taken everything they could out of the vessel, and bivouacked on shore for two days, they got her back into the channel, and anchored off Havik Island in $2\frac{1}{2}$ fathoms.

Bivouac Point, at the north end of this island, lies in $2^{\circ} 20' S.$ and $138^{\circ} 2' 8'' E.$, and the Dutch arms were here set up on a great tree. No trace of natives had been seen during the three days of their stay. The attempt to proceed further was thought imprudent, and they returned down stream, drifting with an anchor overboard to keep way on the vessel. Next day some natives were seen, of very wild appearance, who would not come on board, nor allow them to land, but performed a sort of war dance with bow and arrows. However, after exchanging some of their ornaments, of an unfamiliar appearance, for knives and hatchets, they followed on board. The people of Pauwi mentioned afterwards that the name of this village was Kukunduri, and that they were always at war with the people.* Kukunduri has, perhaps, 50 inhabitants, and Mawa, lower down, about 100. Here the people, having probably heard the experience of Pauwi, were anxious to trade, bringing among other articles coco-nuts. There were no coco-palms in the neighbourhood, and the nuts were said to come from the interior, westward. The people allowed the strangers to enter the village, and the women even appeared from the bush, though they held back, and retired at their approach. At Pauwi their return was cordially received.

The natives call the river the Mamberan, i. e. great river;† but though easily navigable for over 60 English miles, it is not, Mr. Morris considers, the imposing stream it has been hitherto considered. It has only one mouth, though it probably parts with much water through the swamps on its borders. The numberless openings on the east coast of Geelvink Bay between $1^{\circ} 20'$ and $2^{\circ} 30' S.$, are, with the exception of the Aiberan and the Kei, not true river mouths, but outlets from lagoons lying further inland. The sea in front of these openings is colourless, whereas at the mouth of any considerable river there is

* Lieutenant Medenbach mentions that before approaching the boat these people poured water over their breasts and stomachs, in sign of peace—a Papuan custom observed elsewhere, and recorded by Cook as practised in the New Hebrides.

† In Beccari's map, in 'Cosmos,' iii. 10, the name Mamberam is given to a river to the east of the Amberno. Mr. van Hasselt says that the correct rendering is Mamberaminu, meaning "great water."

always a marked discoloration. That the natives, even as far as Kurudu Island and the river Kei, call the Amberno the Great Water, proves that there is no other great river in the district. The river Kei appears to be of no great size or volume of water, as a village is built across it, which would not be the case if it was liable to floods of any magnitude. It is said that small craft can pass from the Kei into the Amberno.*

Mr. Morris holds that the lagoon districts are more thickly peopled than the banks of the Amberno, and that the villages of the latter are only temporary settlements of the lagoon people. The Papuans almost always when possible build in the water, choosing sheltered places where the water is shallow and there is not so much current, or risk of floods, or free access for an enemy, as on a great river. But the people of these lagoons seem to draw their chief sustenance—the sago, from the banks of the Amberno, where vast numbers of sago troughs were observed. The sago tree does not flourish so well in the brackish water of the lagoons as in the fresh-water swamps, and the forests noticed on the Amberno were all sago.

Mr. Morris does not think that even with a steam-launch it would be possible to ascend much higher than the point he reached, viz. 60 miles. The current here ran $4\frac{1}{2}$ miles an hour, the water was muddy, greyish in colour, and the sand from the bottom stained the hand like wet coal. He concludes that there must be some considerable rapids or falls at no great distance. The numerous rolled and veined pebbles, all from a sandstone formation, also suggest a rocky barrier cut through by the river.†

The Danish Scientific Expedition of 1884 in the Gunboat 'Fylla.'

THE *Fylla* is a first-class gunboat of 500 tons register, with engines of 500 nominal horse-power, and a complement of 84 men, under command of Captain C. Normann, of the Danish Navy. The scientific staff consisted of Professor E. Warming, botanist; Mr. T. Holm, geologist; Dr. H. Topsøe, physicist and mineralogist; and Baron Holmfeld followed as artist. The hydrographical researches were executed by the commander and the other officers of the vessel; and for the purpose of studying the flora and the fauna of the sea, the expedition was provided with trawls and scrapers of most improved American construction, while for the deep-sea

* Mr. van der Aa infers from the above that Mr. Morris asserts too absolutely that the Amberno has only one mouth; and it seems evident all the creeks referred to must be regarded as part of the same river system which, thus viewed, has a very considerable area.

† The breadth of the river at Havik Island is 450 to 550 yards. While ready to admit that the river navigation is barred at this point, Mr. van der Aa argues from its size that it has a long course from the interior, cutting its way through the Rees Mountains; and that like some African rivers, as the Congo, its upper waters may be navigable, notwithstanding such interruptions lower down.

researches, and the registration of the temperature of the sea, there were a Sigsbee sounding apparatus, with wire-rope and a fine collection of all necessary instruments. For the determination of the temperature of the sea, thermometers constructed by Negretti and Zambra were chiefly used, some of which were fitted with the splendid automatic reversing apparatus invented by Captain Magnaghi, of the Italian Navy, and some with one constructed by Captain G. Rung, of the Copenhagen Meteorological Institute, by which the turning of the instrument is effected at a given time by the simultaneous freeing of a weight running on the line. The Miller-Casella thermometers with which the expedition was furnished, were but little used, owing to the high temperatures, of which more further on.

To obtain water from various depths, water-carriers on Sigsbee (American), Ekman (Swedish), and Rung (Danish) principles were used, the latter being a recent invention, which was very useful for lesser depths, as it not only brings the required sample of water, but also records the exact temperature, a thermometer being concealed in the axis of the vessel, the mercury column of which is broken as soon as the vessel is full. Steam windlasses were used for hauling the trawls, &c.

The *Fylla* left Copenhagen at the end of May last, and having called at Stornoway and Reykjavik, arrived, towards the end of June, at Godthaab, a colony of 300 to 400 Eskimos, situated on the west coast of Greenland, in lat. 64° N. Already early hydrographical researches had been commenced from Cape Farewell, by following the edge of the Polar ice, which during the summer filled the southern and eastern parts of Davis Straits in vast quantities, and studying the position of the ice belt and the composition of the water in and outside the ice current.

Space does not permit us to give a detailed account here of the movements of the expedition; it must suffice to state that the expedition, being generally stationed at Holsteinborg, lat. 67° N., visited most of the Danish settlements in Central Greenland, its field of research lying between lat. 64° and 70° N., from the innermost creek of Disco Bay (about long. 50° W.) to the middle of Davis Strait, i. e. to about long. $57\frac{1}{2}^{\circ}$ W. An attempt to get further west, and if possible reach the coast of America, at Cape Walsingham and Cumberland Bay, had to be abandoned owing to the enormous ice-masses met with here in July, barring every approach, which, in the middle of August, when the *Fylla* was on her return journey, and in lat. 70° N., approached to within 50 to 60 miles of the Greenland coast, which is very unusual.

The deep-sea researches consisted chiefly of sounding, trawling, and scraping, both on the extensive banks which, between lat. 62° and 68° N., nearly everywhere surround the Greenland shore, with a deep channel between them and the coast, and in the middle of Davis Strait.

The researches did not extend to very great depths, the lowest reached being only about 900 fathoms—south-west of Godthaab, while on the ridge connecting Greenland with Cape Walsingham, at the point where Davis Strait is narrowest, in about lat. 67° N., depths of only 400 fathoms were found. In Disco Bay, where no soundings had before been taken, a depth varying from 200 to 270 fathoms was found, and it was discovered that at the mouth, at a depth of 180 to 190 fathoms, a threshold separates this basin from Davis Strait, and thus prevents icebergs lying deeper in the water from passing from the great fiord of Jacobshavn into the ocean.

Judging by the results of measurements of icebergs effected during recent years by Professor K. Steenstrup and Lieutenant Hammer in this fiord, for the purpose of ascertaining the proportion between their exposed and submerged parts, we find that only icebergs with an average height above the water of 150 feet can float across

this threshold, the respective proportions between the exposed and submerged surfaces being 1 to 8·8, i.e. 1 : 8·41 for blistered glacier ice, and 1 : 9·23 for glacier ice without blisters. For salt-water ice containing 3·3 per cent. of salt it is only 1 : 5·29.

The numerous samples of water taken from the surface, bottom, and intermediate depths during the voyage have naturally not yet been thoroughly analysed, and before this has been done it is hardly possible to say anything definite as to the currents of various depths. This much is, however, certain, that a comparatively warm current of water fills the eastern and central parts of the narrowest portion of Davis Strait—as far as the western ice limit—but that the highest temperature of the same, when the depth is more than a couple of hundred fathoms, is not, as is generally the case, found at the surface, but *nearest the bottom*, and that the coldest layer seems to lie between 30 and 100 fathoms. As an example, may be taken the following series of temperatures obtained in lat. 67° 07' N. and long. 56° 31' W., on July 8th, 1884, the temperature of the air being — 1°·9 C. (28°·58 Fahr.).

At the surface	.. .. .	+ 2°·8 C.	=	37°·04 F.
" 10 fathoms	.. .. .	1°·9		35°·42
" 30	"	0°·9		33°·62
" 100	"	1°·1		33°·98
" 200	"	3°·6		38°·48
" 362	" (bottom)	4°·2		39°·56

Similar conditions the expedition also found everywhere in Disco Bay, but the surface water in this confined basin was considerably warmer, while the bottom temperature was proportionately lower.

We will give an example from lat. 69° 14' N. and long. 52° 54' W. on the morning of July 23rd, the temperature of the air in calm sunny weather being + 10°·2 C. (50°·36 F.) in the shade.

At the surface	.. .. .	+ 7°·7 C.	=	45°·86 F.
" 5 fathoms	.. .. .	7°·1		44°·78
" 10	"	4°·0		39°·20
" 20	"	1°·4		34°·52
" 30	"	0°·1		32°·18
" 50	"	— 0°·2		31°·64
" 70	"	+ 0°·1		33°·98
" 100	"	0°·6		33°·08
" 130	"	0°·9		33°·62
" 200	"	1°·8		35°·24
" 264	" (bottom)	2°·1		35°·78

That the influence of the ice-fiord is here felt at the intermediary depths is obvious, even without any chemical analysis of the water of the various layers. It is, however, very remarkable that the surface temperature in such a high latitude, and in waters constantly covered with enormous icebergs, can in the short summer reach such a height as the above series shows. This is, by-the-by, so far from being a solitary example that most serial temperatures from this locality, which were, however, all taken in calm weather and extended over seven days, show a much higher surface temperature.

The maximum temperature was struck off the colony of Christianshaab, in Disco Bay, in the south-eastern corner, where it was + 11°·5 C. (52°·7 F.) at the surface. At a depth of 5 fathoms it fell, however, to + 2°·8 (37°·04 F.) and stood, from 30 to 100 fathoms at + 2°·2 C. (35°·96 F.). That the icebergs in these waters must melt very rapidly, particularly at the water-line, is evident, and this was further corroborated by observation: all being deeply furrowed and heeling over.

The trawlings and scrapings extended to a depth of 300 fathoms, and were prosecuted in Davis Strait, Disco Bay, on the banks and in the fiords. The harvest was rich, and several varieties of lower animals, previously unknown in the Greenland Seas, were caught, as well as a few entirely new species. As the case was with former expeditions, the harvest was richest on the banks, and poorest in Disco Bay, where several hauls at a depth of 200 to 250 fathoms brought up absolutely nothing or only a couple of specimens of the same species. The trawl worked here so deep down in the soft black clay, which everywhere covers the bottom, that the rope constantly threatened to break. A total of 300 specimens of the deep-sea fauna were brought home by the expedition.

The stay in port was utilised by the officers of the vessel for hydrographical work and the charting of certain fiords, and by the botanists for excursions into the long narrow fiords where the vegetation is richest, and to the islands outside them. The harvest was very good. Of phanerogams and higher cryptogams alone specimens of 225 species were obtained, and although no new plant was discovered, several were found in entirely fresh places, whereby their geographical distribution has been increased with several degrees of latitude. Thus, *Linnea borealis*, for the first time last year discovered in Greenland, and then in latitude 61°, was this year found as far north as 67°. In addition to collecting dried plants and others in spirits, special attention was given to the collecting of materials for illustrating features in the life of the fauna of the Arctic regions which have hitherto been neglected. Great attention, too, was paid to the algæ-fauna, although the same is very poor in the waters visited by the expedition.

The mineralogical harvest of the expedition was naturally poor, for the reason that Greenland has already been so thoroughly explored, geologically and geodetically, by such eminent men of science as C. L. Giesecke, Dr. Rink, Professors Johnstrup, Steenstrup, and Nathorst, that little more is to be learnt. One object of interest was, however, brought home, viz. a block of ironstone, found on the shores of Disco Island, at Uifak, in lat. 69° 20' N. It is of the same kind as those discovered there some years ago by Baron Nordenskiöld, and which were at first believed to be meteorites, but whose terrestrial origin must be said to be beyond question since the eminent geologist Prof. Steenstrup has discovered nickel-iron, in lumps of all sizes, and of exactly the same kind as that contained in the blocks in the great basalt strata of Disco Island. The block, which weighs about 1800 lbs., has been presented to the Mineralogical Museum in Copenhagen, where it will be mounted among others from the same locality.

On the return journey very rough weather was encountered in Davis Strait. A stay of a few days was made at Cape Reykjanes, the south-west promontory of Iceland, for the purpose of examining a new island, which, it was stated, had suddenly appeared there at the end of July. It could, however, not be found, and great doubt is entertained as to whether it has ever existed; if so, it must have disappeared as quickly as it rose.

In September the *Fylla* arrived in Copenhagen. The scientific material collected is under treatment, but considerable time must necessarily elapse before the result can be made known.

As regards future researches in Greenland, it may be added that, in addition to the expedition now there under Lieutenant Holm,* an expedition will probably be despatched next year to the west coast for the purpose of charting some portions of the coast—about 100 miles—still unknown. The survey of the whole coast from Cape Farewell to Upernivik (from 59° 44' to 72° 40' N. lat.) will then be completed.

* 'Proceedings R. G. S.,' 1884, p. 533.

GEOGRAPHICAL NOTES.

Ascent of Mount Roraima.—Sir Joseph Hooker has received from Demerara gratifying news, by letters and telegram, regarding the progress of Mr. im Thurn's expedition. One of the letters, the latest in date, viz. December 6th, recounts the difficulties and privations of the long march over rugged mountains and through dense forests from the river Potaro to an Indian village on the southern side of Roraima, and describes the ascent, on the 5th of December, of the precipitous mountain slope to a height of 5600 feet. The exploring party descended to the village on the same day, intending to make preparations for a second climb to the place, build a hut there, and spend a week or more in making natural history collections, this elevated spot being "a very garden of orchids and most beautiful and strange plants." From the intended site of their hut they had seen a place where the summit of the mountain seemed accessible; but if this should prove not to be the case, Mr. im Thurn intended to pass round the south-western corner of the mountain mass and attempt the ascent on the western side. This letter, as already stated, was written on the 6th of December. The following brief telegram reached Sir Joseph Hooker at the same time as the letters: "Demerara, February 7th, 1885. From im Thurn to Hooker, Kew. Ascended."

Lake Mistassini.*—At the annual meeting of the Quebec Geographical Society, held on the 30th January, a paper was read by Mr. Bignell, land surveyor, giving some information regarding the mysterious inland sea, known as Lake Mistassini, in Rupert's Land, visited by him last summer. The portion of the lake nearest to Quebec is divided, by a long narrow peninsula, into two great arms, the most north-westerly of which, called Foam Bay, is about 300 miles from Lake St. John, and less than 10 miles from the great watershed of that portion of Canada which separates the rivers flowing into Hudson Bay from those flowing into Lake St. John and the St. Lawrence, and forming the boundary between the province of Quebec and Rupert's Land. One of the most remarkable features is the small elevation of this watershed; it is nowhere more than six to eight feet in height, and sometimes much less, being found at times by Mr. Bignell most difficult to trace at all. The Hudson Bay Company's post, a small station in charge of the factor or trader, Mr. William Miller, consisting of half-a-dozen buildings, was the only settlement, of any kind, found in the vicinity. The Indians residing in the neighbourhood of the post, belong to the Montagnais tribe; they subsist upon the wild-fowl and fish of the lake, leaving in autumn for the woods, on their annual hunting and trapping expedition. They appear to be of a friendly disposition, are nominally Christian,

* Vide 'Proceedings R. G. S.,' 1884, p. 681.

though still holding to a number of heathenish traditions.—The climate is reported less severe than would be supposed from the latitude of the lake. In 1883 ice first appeared on the lake on the 4th of November, but the main body was not frozen over until the middle of January. In 1884, the ice broke up on the 22nd of May, but had not entirely disappeared until the 8th of June. Potatoes and other roots are raised at the post, and oats, it is believed, would ripen. The flora differs little from that immediately adjoining the watershed on the other side. The ground is covered by what is known as the sub-Arctic forest, principally consisting of canoe birch, tamarac, poplar, balsam, and spruce. The timber appears to be little suited for merchandise, most of the trees averaging seven to eight inches in diameter, a few running to twenty-two inches. The soil is considered by Mr. Bignell well suited for agricultural purposes. The animals in the vicinity of the lake are the caribou, moose, bear, lynx, wolf, wolverine, otter, mink, weasel, hare, red, black, white, silver and cross foxes, and black bears of unusual size and ferocity. No further information will be forthcoming regarding the actual extent and configuration of Lake Mistassini until the return of the expedition now engaged in its survey. Mr. Bignell explored it for 120 miles without reaching the main body of water, and it is his opinion that this vast lake is an expansion of the Rupert River, as the great American and Canadian lakes are of the St. Lawrence. As in the case of Lake Superior, the turbulence of its waves frequently gives warning twelve to fourteen hours in advance of approaching storms.

The Amberno River, New Guinea.—We call attention to the brief account given at p. 172 of this number of the 'Proceedings,' of the ascent last autumn of this river by Mr. Van Braam Morris, in the Dutch Government steamer *Havik*. It will be remembered that it formed part of Mr. Wilfred Powell's scheme of exploring New Guinea to endeavour to reach the central highlands by means of this river, which was supposed to be of great magnitude. The stream proves, however, to be of much smaller dimensions than was supposed. The *Havik* ran aground at a point distant only 60 English miles from its mouth, and many of the openings on the coast, supposed by D'Urville and others to be arteries of a great delta, were found by Mr. Van Braam Morris to be simply the outlets of maritime lagoons. Mr. Robidé van der Aa, it will be seen, thinks that, notwithstanding the interruption to its navigability so near to its mouth, the river is a large stream flowing from a great distance in the interior. We shall probably not have long to wait before hearing of other attempts to solve the interesting problem—let us hope by Dutch explorers, who have so gallantly led the way. Mr. Van Braam Morris discovered in his first voyage along the north coast another river of considerable magnitude, and a fine harbour a little west of Humboldt Bay; both important additions to our knowledge of this part of New Guinea.

Buonfanti's Journey across Africa.—The *Bulletin* of the Belgian Geographical Society has recently published an account of a remarkable journey across Northern Africa, alleged to have been performed by the Marchese Maurizio de Buonfanti and Dr. Van Flint, an American. The two explorers are stated to have left Tripoli on April 1, 1861, and their intention of exploring Adamaua having been frustrated, they aver that they ascended the Niger from Say to Timbuktu, and concluded this remarkable journey by travelling from the famous African emporium through the unexplored kingdoms of Tombo, Mossi, and Bussango, to Lagos, where they arrived about March 1883. Dr. G. Krause now writes from Lagos to the editor of the 'Mittheilungen' that he resided at Tripoli at the time these explorers are stated to have left that place, and that, although he was on intimate terms with the Italian and American consuls, he never heard their names or their enterprise mentioned. Nor are they known at Lagos; neither to the only Italian resident of that place, nor to the French missionaries. The Marchese is at present in the service of the Belgian Association. The statements made by Dr. Krause are very circumstantial.

Another German Annexation on the West Coast of Africa.—Herr F. Colin, of Stuttgart, whose factory lies on the Debrecka river, which flows into the Sangareah Bay to the north of the Los Islands, having purchased some land from native chiefs, appealed to his government for the protection of the German flag. In consequence of this appeal, Captain Chûden has made treaties with several native chiefs, and the islands of Murura and Konebombe, as well as a considerable tract on the mainland, have been placed under German protection. The territory thus annexed is described as fertile, the climate as agreeable, and the natives of a peaceable disposition. The Debrecka river is navigable for a considerable distance.

An Ascent of the Cameroons Peak.—Captain von Rogozinski and Dr. Hugo Zöller, the special correspondent of the *Kölnische Zeitung*, succeeded, on December 12, in reaching the summit of the Cameroons Peak. They started from Bota, a village in Ambas Bay, and were attended by ten Krumen, who carried a tent, blankets, and provisions. The first day led through a primeval forest of magnificent trees, as far as Boanda, the highest village on this side of the mountain. Still continuing through the forest, they reached, on the second day, the Issuma cavern, lying already beyond the Little Cameroons or Mongo ma Etindeh. The third day proved exceedingly fatiguing. Ten Bakwiri cut a path through the bush. The forest terminated at a height of 6500 feet. About an hour's walk beyond, the explorers came upon Mann's Spring, where four Swedes had recently built themselves a hut. In the course of that day many recent traces of elephants and wild coffee trees in large numbers were seen. The fourth day's march led over grass-clad slopes and lava

streams to a hunter's hut (8600 feet), which is occasionally occupied by Buea carriers. On the fifth day the travellers started at dawn. A little after eleven they arrived at the edge of a lava stream about two miles in width, where they pitched their tent, and then, attended by their guide, they made for the summit. The cold was severe, the thermometer marking 39° F., yet antelopes of large size were met with at this height. At 3.45 P.M. they stood on the rim of the crater of Mongo ma Loba. No traces of recent volcanic activity were observed. Captain Burton, who first ascended this mountain, discovered a solfatara to the north-east of the Albert Peak, and as flames have been seen repeatedly from passing steamers, and as recently as 1868, it can scarcely be doubted that the volcanic activity of Mount Cameroons is not yet quite extinct.

Obituary.

Major-General C. G. Gordon, R.E., O.B.—The heroic soldier and exalted philanthropist, whose recent loss by a tragic death, we in common with the whole nation deplore, was born at Woolwich, January 28th, 1833, the son of Henry William Gordon, a scion of the old Scottish clan whose headquarters are in Aberdeenshire, who himself attained the rank of Lieutenant-General. Young Gordon entered the Royal Military Academy at Woolwich at the early age of fifteen. Although his career at the Academy does not appear to have been brilliant, he passed all his examinations so creditably as to obtain a commission in the Royal Engineers. After spending a short time at Pembroke Dock, employed in connection with the fortifications being there erected, he was sent out to the Crimea at the end of 1854. Here he was at once assigned a prominent part in the engineering operations which were being conducted in front of Sebastopol, and here he exhibited those qualities which in their after development elevated him to the rank of the hero whom we mourn. His unconsciously reckless bravery, his heedlessness for his own safety, his skill and enthusiasm in his profession, his sympathy with his men, and his magnetic influence over all with whom he came into contact, were conspicuous enough to attract the notice of his fellows and superiors. The end of the war, however, did not send him home. He was ordered to Bessarabia as one of the Commission to define the frontier of that part which by the Treaty of Paris was to be restored to Moldavia. This duty began in 1856, and Lieutenant Gordon with his companion Lieutenant James rode the marches for nearly a year, verifying or correcting the Russian maps, surveying the boundary line, and carrying despatches. Even after this somewhat tedious work, which, however, Gordon enjoyed, he was not permitted to return to England, but was ordered to Armenia to take part in the Delimitation Commission of that region under Colonel (now Sir Lintorn) Simmons. Here for six months he wandered about in the performance of his duties, greatly interested in the new people with whom he mixed and in the places abounding in historical associations. After six months in England in the winter of 1857, he returned once more to Armenia in the beginning of 1858 as special Commissioner to the Caucasus, to arrange certain points in connection with the Armenian frontier on the Russian side. On this occasion he ascended one of the peaks of Mount Ararat. On his return to England, Gordon was stationed at Chatham for a short period, attaining the rank of Captain in April 1859. In 1860 he was sent to China to take part in the Anglo-

French expedition which was endeavouring to compel the Chinese to ratify Lord Elgin's treaty. Gordon was present at all the operations, of which the burning of the Summer Palace remains the most conspicuous, an episode which he describes with graphic sadness. While stationed at Tientsin he surveyed much of the country around that city, mapped down the road along the banks of the Peiho to the Taku forts, and made an excursion in company with a friend to the Great Wall at Kalgan, through a part of China then but little known. After spending almost two years in the north of China, Gordon accompanied some of the English troops to Shanghai, the neighbourhood of which was being depredated by the Taeping rebels, taking an active part in the operations during the last six months of 1862, which resulted in the clearing out of the rebels from all the towns within a radius of thirty miles of the city. After this was accomplished it was Gordon's duty as Captain of Engineers to make a complete survey of all the region which had thus been cleared of the rebels. In this way he gained a complete knowledge of the country and the people, which was of the greatest service to him in those subsequent operations which made his name known all the world over as "Chinese Gordon." Into the details of the hard fighting that he undertook as the leader of the "Ever Victorious Army" (which only deserved the name after he assumed the lead) we cannot enter here. Suffice it to say that at the request of the Chinese Government Gordon (with brevet rank of Major) was appointed to command the wretched and mutinous rabble which under other officers, American and European, had been in vain endeavouring to clear the rebels out of the Province of Kiangsu, which was still almost entirely in their hands. Gordon assumed command on March 24th, 1863, and in a week after took the field. He had throughout to contend as much against his mutinous and demoralised rabble of an army, as against the enemy. Nevertheless, in little more than a year, by dint of military skill, determination, bewilderingly rapid marches, and personal bravery, Gordon took one rebel stronghold after another, until on May 11th, 1864, Changchow, their last position, was captured, and the Taeping rebellion completely suppressed. Gordon declined, with indifference and some contempt, the riches which the Chinese Government pressed upon him, for his soul burned with indignation at the treachery and cruel conduct of its representatives in massacring the rebels who had surrendered at Foochow, for whose safety Gordon had pledged his word. Moreover, we all know that Gordon was almost eccentrically indifferent to money, so much so, that it is doubtful if he has left anything behind him.

These brilliant Chinese operations made the name of Lieut.-Colonel Gordon the property of the world. He had obtained the exceptional distinction of Brevet Lieut.-Colonel in the beginning of 1864, and what is still more exceptional in the case of an officer of his rank, engaged in such service as he had been, he was made a C.B. on his return home. Then followed the Gravesend period, during his residence at that station as chief Engineer officer in the beginning of 1865. Here he resided for the next six years, and probably in no other town in the Empire has his death been more deeply lamented. And no wonder, for the name of "the Kernel," as he was familiarly called, soon became synonymous with all that is most Christ-like in humanity. Many a brave sailor and well-to-do colonist has to-day to bless his merciful hand and generous heart for rescuing them from a career of crime. Characteristically it became his practice to follow the after-lives of his rescued waifs and to mark the course of the vessels in which they had sailed with pins on the map, from which he inspired his youthful audience with their first lessons in geography. It was a sad day for Gravesend when in 1871 the "Kernel" took his departure for Galatz, where he was stationed for about two years as British Member of the Danubian Commission. The deep Sulina Channel, by which vessels of large burden

can now load at the Galatz and Braila wharves, is mainly Gordon's work. Fourteen years after, Mr. Forbes tells us, he found the memory of Gordon still cherished at Galatz.

The next period of Gordon's kaleidoscopic life is that in which Englishmen, and certainly geographers, are most interested. It was in February 1874 that Gordon arrived at Cairo to succeed Sir Samuel Baker as virtual potentate of the Sûdan. The memory and tradition of his beneficently vigorous rule there will probably never be forgotten; and generations hence, when that unhappy region becomes "a land of settled government," the people will tell their children the thrilling story of their white benefactor. That it is impossible for us to do here. Of his flashing rides from Khartûm to Kordofan, from Kordofan to Darfur, back to Berber, across the desert to Abyssinia, back again to Darfur, off on his solitary camel right into the midst of Suleiman's slave-hunting camp; up to Gondokoro, on to the Albert Nyanza, to trace the Victoria Nile; north once more to free the slaves and put their hunters to flight; down the Red Sea to Zeila and on to Harrar; and so from one place to another, welcomed by the natives and dreaded by the slave-traders and speculators, did Gordon spend his five years until in 1879 he saw his services were no longer wanted by the new Khedive, and resigned. Before, however, quitting this most interesting period of Gordon's career, we must refer at more length to the service he did for geography, either directly or through his faithful and sympathetic henchman Gessi and other members of his staff.

General Gordon was elected a Fellow of our Society in 1858; but during his long absences abroad he allowed his membership to lapse. He never, however, lost his interest in geography, particularly in scientific survey and mapping, and during his brief residences in England was a constant visitor to the Society's rooms. He took particular interest in our collection of maps, to which he was a large contributor, no fewer than twenty separate maps, many of them in MS., relating chiefly to his surveys of the Upper Nile, having been presented by him at different dates. But he did not value the fame of a geographical explorer, and refused the honours that were offered to him in recognition of his splendid work on the Upper Nile. All that he was willing to accept was the position of Honorary Corresponding Member, which was accorded to him by the Council in 1880.

His survey work in remote parts of the Nile, especially from Gondokoro to Albert Nyanza and on the Victoria Nile between Murchison Falls and Nyamyungo, was executed with all his characteristic accuracy and thoroughness. Most of it was done by himself personally, by boat or in toilsome marches, in bad weather and amid every kind of privation, along the rugged banks of the stream. That he was not insensible of the importance of the work thus accomplished is shown by frequent allusions to it in his diary, in one place of which, dated Mrooli, August 23, he writes: "This bit of the Nile (between Urondogani and Victoria Nyanza) I am forced to give up. . . . You can imagine how I feel about this bit of the Nile, for it is the *only bit* I have not done from Berber upwards to Lake Victoria."* It must be remembered that before Gordon explored this part of the Nile system the actual connection of the two Equatorial Lakes, Victoria and Albert, with each other, or with the Nile, had not been traced by any traveller, and was even doubted by so eminent an authority as Dr. Schweinfurth, who, in a paper published a short time before said, "It may be that Lake Albert belongs to the Nile Basin, but it is not a settled fact; for there are seventy miles between Foweira and Lake Albert never explored, and one is not authorised in making the Nile leave Lake Albert. The question is very doubtful."† When Gordon completed his three years' herculean labour in these equatorial regions

* 'Colonel Gordon in Central Africa,' p. 182.

† Ibid., p. 177.

those doubts were not only set at rest, but the scientific world were put in possession of detailed surveys of the river near the lakes such as we do not possess of any other part of Central Africa.

The interesting problem of the Albert Nyanza, its dimensions, its extent southward, and its connection or otherwise with some still more southerly river or lake, Gordon himself resolutely refused to settle by his own personal exploration, notwithstanding the invitations to do so that were addressed to him, and the great additional honour that he would have gained by it. He held firm by his duty to the Khedive and the natives he had reduced to his rule, which he believed was inconsistent with geographical exploration simply for the sake of discovery. He deputed, however, his officer, Romolo Gessi, to undertake the work, and it was accomplished in April, 1876; Gessi completing the circumnavigation in boats in nine days, and finding no river or opening in the south end, and the area of the lake much smaller than had been supposed. This was a few months before Gordon himself entered for the first time Albert Nyanza, which he did with a steamer and boats in July 1878.

Although averse to communicating papers himself to the Society, he encouraged his officers to do so. Two of them, Lieutenants Watson and Chippindall, contributed a paper and map on their "Traverse Survey of the White Nile, from Khartum to Rigaf," published in the 46th volume of the Journal. The same volume of the Journal contains the only paper communicated to us by General Gordon himself, a brief one entitled "Notes to accompany a Survey of the White Nile from Lardo to Nyamyungo," which is illustrated by a map, teeming with original and exact information, reduced from a MS. map sent by Gordon, which is now in the Society's collection. Other short papers by him, published in the 'Proceedings' (vol. xxi. pp. 48, 49, 56) were letters to General Stone, Chief of the General Staff, Cairo, and other correspondents, and by them communicated to the Society. A paper by Lieut. Chippindall on "A Journey beyond the cataracts of the Upper Nile towards the Albert Nyanza," was published in the 'Proceedings,' vol. xx. p. 67. Gessi's account of the circumnavigation of Albert Nyanza was published in 'Proceedings,' vol. xxi. p. 56.

In May 1880 he accepted the post of Private Secretary to Lord Ripon, the newly appointed Viceroy of India; but to this brief and curious episode in his career we need only allude; he resigned the office before he had really entered on its duties, and left India for China, where he succeeded in averting war between that country and Russia. Subsequently he went to Mauritius for a year to oblige a brother officer; and afterwards accepted service in Basuto-land on behalf of the Cape Government, whose treatment of the General (as he now was) has yet to be explained. During nearly the whole of 1883 he resided in Palestine, mainly at Jaffa. This last episode, and his occupations and letters during the year, recall the strange religious aspects of Gordon's character, which it is impossible here to discuss. In an earlier age, such a man as he might have charmed the whole of Europe to follow him in a Crusade against the Mahommedan Mahdi. But "with the faith of a Christian and the brain and eye of an engineer" he passed his time in surveying the Holy Sepulchre, the Tabernacle, and the walls of Jerusalem. He was moreover greatly interested in the proposed Jordan Canal, into the details of which he entered with enthusiastic thoroughness.

Then comes the last scene of all, the year of terrible excitement and anxiety which has just passed. Into the history of the Mahdi movement we cannot enter; suffice it to say that, about a year after Gordon resigned the Governorship of the Soudan in 1879, we first hear of this Mahommedan Messiah. Had Gordon been on the spot at the time, we may feel sure that the rising would have been nipped in the bud. But it rapidly gathered strength; and one disaster to the Egyptian arms

after another, in which English officers were involved, and other considerations, compelled an appeal to the one power capable of coping with a movement that threatens to expand into a struggle between Islamism and Christianity—General Gordon. He had gone to Brussels to receive his last instructions from the King of the Belgians previous to his departure for the Congo, when a telegram from his own Government summoned him home, and almost within twenty-four hours of his leaving Brussels (January 18th, 1884), Gordon was once more on his way to the Sûdan.

The immediate purpose was to extricate the Egyptian garrisons and restore to the native chiefs their ancestral powers, in other words, to effect the abandonment of the Sûdan. The scene at Charing Cross Station when Gordon left, as described in the papers of the time, was very interesting: "Lord Wolseley carried the General's portmanteau, Lord Granville took his ticket for him, and the Duke of Cambridge held open the carriage-door." On the 27th, Gordon quitted Cairo as British High Commissioner and Governor-General of the Sûdan; up the Nile with his companion, Colonel Stewart—another brave officer whose bones are bleaching on the insatiable desert—across the Nubian Desert without escort to Berber, which he reached on February 11th, and exactly a week later he entered Khartûm. How he managed for a year to live and rule in Khartûm, with thousands of fanatic enemies outside, and a city more than half full of treacherous friends inside, is little short of miraculous.

A woful day it must have been for the poor people whom he had protected so long when the treacherous scoundrel who owed his life to Gordon opened the gates of Khartûm to the Mahdi's forces. Of the details we are yet ignorant; but so far as can be made out from the somewhat inconsistent accounts which have reached us, Khartûm fell about January 26th, and its benefactor and defender fell with it.

This is not the place to indulge in all the reflections suggested by the strange career of this remarkable man. It is to be hoped that some one competent to do so will make a study of his personality and his life-work, abounding as they do with problems of curious interest to humanity; problems the solution of which is more likely to be found in sentiment than in science; for, in spite of all the advances of the last half century, the world is ruled far more by the former than the latter, and it ever will be so. Only one point shall we indicate, that in this the most democratic age of the world's history, we have in Gordon's whole career the most striking instance of "one-man power" on record; and should the world become in the remote future a great federal democracy, this species of power will be as potent as ever: both science and history tell us it must be so. We may, even in a scientific journal, in the case of a man of Gordon's character, be permitted to quote the concluding verse of Aytoun's "Scottish Cavalier," which to some extent must express the feeling of us all:—

"Oh, never shall we see again a heart so stout and true;
The olden times are passed away, and weary are the new.
The fair white rose has faded from the garden where it grew,
And no fond tears, save those of heaven, the glorious bed bedew
Of this fine old Scottish cavalier,
One of the olden time."

Edward Caldwell Rye.—Since the issue of our last number the Society has sustained a severe loss by the death of its able and much-respected Librarian, Mr. E. C. Rye. He died on the 7th of February, after a short illness (confluent small-pox) contracted it is not known how, in the plenitude of life and strength, and in the midst of the varied work which he so much enjoyed and did so well. He was a man of versatile talent and varied attainments; a scrupulously accurate bibliographer, and an excellent librarian, a press-writer of no mean ability, an entomologist of authority and

sound repute, an athlete well-known in boating circles on the river, and a draughtsman of great inventive and humorous power and skill. He was also remarkable for his unremitting industry, activity, and conscientious devotion to duty. Few men of our day have accomplished more in the way of bibliographic drudgery. From an early date he was one of the principal compilers of the well-known and useful annual, the 'Zoological Record, or Record of Zoological Literature,' and of late years he fulfilled the not less trying duties of editor of that publication. His exhaustive 'Bibliography of New Guinea,' published in part ii. vol. i. of our Supplementary Papers, is another example of his industry and abilities in this class of literary work. The library of the Society, which at the time of his taking charge of it, ten years ago (in March 1875), was very defective, especially as regards its extensive series of scientific Transactions in all languages, has been greatly improved and increased under his care, nearly all *lacunæ* in serial works, so difficult to rectify, have been filled up, and the innumerable additions in volumes and separate papers which have daily flowed in, have been registered and classed for facile reference, with the necessary promptitude. In 1882 he completed the 'Second Supplement to the Alphabetical Catalogue,' containing the additions from 1870 to 1880, which forms a volume of 380 pages.—Our late colleague was in his fifty-third year when he died, having been born on the 10th of April, 1832. He was the eldest son of Edward Itey, Esq., of Chelsea, and was educated at King's College School. His early tastes were in the direction of natural history, which he cultivated with an ardour and devotion which somewhat interfered with his success in the profession, the law, which was chosen for him. He married on the 20th of August, 1867, Isabel, the second daughter of Mr. G. R. Waterhouse, the late Keeper of the Geological Department in the British Museum, and leaves behind him a widow and four children.

REPORT OF THE EVENING MEETINGS, SESSION 1884-5.

Fifth Meeting, 26th January, 1885.—The Right Hon. Lord ABERDARE, President, in the Chair.

PRESENTATION.—*The Rev. Chauncy Maples.*

ELECTIONS.—*Thomas Lindsay Anderson, Esq.; George Barclay, Esq.; William Darley Bentley, Esq.; Herbert H. Somers Cocks, Esq.; W. S. Furneaux, Esq.; Edmund Smith Hanbury, Esq.; Captain George A. Harragin; William Cuthbert Headland, Esq.; Guy Le Strange, Esq.; George Fredk. Meredith, Esq.; Harry Loveday Pike, Esq.; Edwd. Townend Piper, Esq.; W. Stewart Thomson, Esq., M.A.*

The following paper was read:—

"Expedition to Mount Kilima-njaro." By H. H. Johnston, Esq. (*vide ante*, p. 137).

Sixth Meeting, 9th February, 1885.—FRANCIS GALTON, Esq., F.R.S., Vice-President, in the Chair.

ELECTIONS.—*John Harwood Blakey, Esq.; Griffith Evans, Esq., M.D.; Lieut. J. D. Fullerton, R.E.; William Gordon, Esq., D.L.; William Delisle Hay, Esq.; Hubert John Antony Hervey, Esq.; John Frederick Heyes, Esq., M.A.; John Brookes Johnston, Esq.; John Michael Cramsie Johnston, Esq.; Rev. J. Hinton Knowles; Edward Wilmot Lambert, Esq.; Rev. L. W. Lloyd; Walter C. Mockford, Esq.; William John Newton, Esq.; Walter H. Lancelot Shadwell, Esq.; Charles Smith, Esq.*

ANNOUNCEMENTS.

On taking the Chair, Mr. GALTON said the Society would be glad to learn that their Inspector of Geographical Education, Mr. Keltie, has made considerable progress. One result of his labours is that a large collection of gifts or loans and a few purchases, illustrating the best educational maps, diagrams, pictures, and globes made in Belgium, Germany, Austria, Italy, and Switzerland, is already in the possession of the Society, and that more specimens from these and other countries, as France, Holland, Sweden and Norway, are daily coming in or expected. The Council is considering the most appropriate way of displaying this unique collection.

It will afford material for a very interesting and novel Evening Meeting in April or May, which will be followed by a course of afternoon lectures, more especially to geographical teachers. The Society will be duly informed as soon as the arrangements are completed. This preliminary announcement is made in the assurance that its members will take pleasure in learning that the efforts of their Council in the cause of geographical education are in no way relaxed, although the Public School prizes have been discontinued.

In connection with the subjects of the papers about to be read, Mr. GALTON said that Blantyre, which is the goal of one of the journeys described, and the point of departure of the other, will become a station of much geographical importance through the astronomical labour of Mr. Consul O'Neill. That gentleman has made an unusually large series of lunar observations at Blantyre, which, judging from the excellence of his sextant work elsewhere, cannot fail to contain material for fixing the longitude of that station with much greater accuracy than is usual with sextant observations. The Council are so impressed with the advantage of an exact determination of some one position in Eastern Africa, such as Blantyre, upon which the cartography of the southern portion of its interior may be securely based, that they have granted the considerable sum of 80*l.* for the exact calculation of Consul O'Neill's observations, which are now being computed.

The following papers were then read by the Rev. Chauncy Maples:—

1. "Recent Journey from Quillimane to Blantyre." By H. E. O'Neill, H.M. Consul, Mozambique.
2. "Return Journey Overland from Blantyre to Quillimane." By D. J. Rankin. Will be published in a subsequent number of the 'Proceedings.'

PROCEEDINGS OF FOREIGN SOCIETIES.

Geographical Society of Paris.—November 21st, 1884: M. BOUQUET DE LA GRYE, of the Institute, in the Chair.—M. Ch. Rabot, who had recently returned from a journey in Scandinavia, forwarded several maps which he had been commissioned to present to the library of the Society. These included a map of Sweden in fourteen or sixteen sheets prepared by Captain Selander from recent surveys executed by officers of the Swedish staff, and a map of the Scandinavian Peninsula by Dr. Roth, showing in full relief the steep declivity presented by the eastern side of the mountains of Lapland. M. Rabot remarked upon the astonishing cheapness of several school atlases, of which he transmitted copies. He also presented the second volume of the French translation (Paris, 1884, Hachette & Co., 8vo.) of the '*Voyage de la Vége*,' the work of himself and M. Lallemant, engineer of mines.—The French National Society of Antiquaries wrote informing the

Society of an appeal made by it to all the French learned societies, urging them to support a scheme, formulated by that society, and about to be presented to the Chambers, for the protection and preservation of ancient monuments, more especially in French Africa, but also in all territory belonging to France.—A communication was received from the Commercial Geographical Society of Würtemberg, which meets at Stuttgart, announcing its formation.—The Society also received intimation of the project for the formation of a Geographical Society at Manchester, the character of which would be chiefly commercial. It was stated that as many as 300 names had been received by the organising committee.—A request had been made to the Society by a Professor of Geography at the Military School for Subordinate Officers at Saint-Maixent that this school should be added to the list of those to which the Society awards prizes at the end of each academic year to the best students in geography. The administrative council of the Society had acceded to this request.—Admiral Mouchez, in addressing the meeting, expressed a wish that all modern maps should be free from those curvilinear hatchings, which were intended to represent the waves of the sea, because they obscured to a large extent the details of the coast and maritime parts of the maps. These blueish ornaments, he said, were purely fanciful, and, although perhaps pleasing to the eye, had no "*raison d'être*." He expressed his astonishment that the magnificent map of Algeria, scale 1 : 50,000, executed by the War Office, and in course of publication, retained this antiquated vestige of the cartography of a bygone age. Colonel Perrier (of the Institute), Head of the Geographical Service of the Army, who was present at the meeting, stated that the observations of the admiral would be taken into serious consideration, and that this useless appendage would disappear from future maps.—M. Mich. Venukoff announced that he had just received a good map of the island of Saghalien, prepared on the scale 1 : 680,000 by M. Nikitine, topographer, under the direction of Colonel Bolcheff. This map, which differed from all other maps of the same island, M. Venukoff had taken as the basis of his calculation of the superficial area of Saghalien, which he reckoned at 28,390 square miles (73,529 square kilometres). According to M. Reclus, the area was only 24,560 square miles (63,600 square kilometres), while M. Strelbitzky estimated it at 25,880 square miles (67,018 square kilometres). The former had not indicated the basis of his calculation, and the latter had availed himself of a manuscript map, scale 1 : 4,200,000, which was therefore $2\frac{1}{4}$ times smaller than that used by M. Venukoff, whose figures for the area must necessarily be more accurate than the others mentioned above. However, he himself did not regard his calculation as absolute, but only considered it as approaching nearest to the truth. M. Venukoff had also received the report in detail of the journey, accounts of which he had already communicated to the Society, of M. Coudriavtzeff across Russian Lapland between Kandalakcha and Kola. The special aim of this expedition was to effect a geological exploration of the country, but the interests of natural science generally had not been overlooked. M. Vennkoff quoted several numerical data given by the author with respect to the configuration of Lapland.—A communication was received from M. Alf. Marche, written from Manilla, stating that he had returned from a partial exploration of the Calamiane Archipelago, which he had accomplished in spite of the heavy rains prevailing during three months of the time. He had visited in particular the island of Busnanga, and had ascended its most important river, which was for a space of three miles very nearly navigable in a canoe. This isle was exceedingly fertile; its plains, varying from 250 to 750 acres (one to three square kilometres) in extent, were well watered, and irrigation would be easy for every kind of cultivation. The place was, however, but little cultivated in consequence of want of labour. A few cattle were reared, perhaps from 400 to 500 head. The corre-

spondent was going to start on a visit to a group of small islands in the Sulu Archipelago.—M. F. Foureau announced the project of the journey which he intended to undertake shortly from Uargla to the Niger. He presented the plan and details of this new Trans-Saharan exploration, for which he would probably receive a mission from the Minister of Public Works.—A communication was acknowledged from M. Edm. Groult intimating that it was to the initiative taken by a few French merchants and manufacturers residing in London, headed by M. Fontaine-Besson, that the formation of a French Chamber of Commerce in London was due. These merchants had decided to send to Tongking some respectable young men of French nationality, able to speak English and with business qualifications, for the purpose of establishing in that colony offices for the sale of European goods and the purchase of the products of the country. The idea was to dispense with middle-men, the necessities of Tongking having been partially supplied, even since the French occupation, by the merchants of Hong Kong and Saigon, and this course naturally led to an increased charge on the goods, in consequence of extra expense and profits. The first party of these young men had already started, and M. Groult invited the large French manufacturing houses, whose interest it was to establish fresh outlets for their goods, to follow this example.—M. Georges Revoil laid upon the table two articles, which were remains of the unfortunate expedition of Baron Von der Decken, massacred, as only too well known, with all his staff by a Somali tribe on the Juba. The articles were an object-glass and a frame belonging to some photographic apparatus carried by the chief of the expedition. One of these objects had been found in the hands of the natives of Brava, while the other had been sent to M. Revoil by the Superior of the Bagamoyo Mission, who had bought it from some negro coasters. M. Revoil found at Mogadoxo a spoon and a fork belonging to the same expedition. These he had forwarded to the captain of a Hamburg vessel, in order that they might be placed in the Brunswick Museum, where all the melancholy remains of this expedition were being preserved. The two fresh relics would also be despatched to the museum.—The Minister of Foreign Affairs communicated a report of the French Consul at Chicago upon the American expedition under Lieutenant Ray to Point Barrow.—Another official of this service, viz. M. Ernest Crampon, Consul at Manila, forwarded a report by him on French commerce in the Philippine Islands. He states that England occupies the first place in commerce, both as regards imports and exports to these islands. It is she who purchases two-fifths of the entire produce of the country, but she sells even more than she buys. Textile fabrics and cotton goods are in those parts the principal articles of English commerce, the imports in these goods being from 1,200,000*l.* to 1,400,000*l.* sterling (30 to 35 million francs). But, independently of her own commerce, the mercantile marine of England carries a large part of the goods sold and bought by other nations trading with the Philippine Islands. The commerce carried on there by England on account of other nations and with products not her own, is very extensive. Moreover, outside commerce and navigation, English capital has found in this archipelago other profitable investments, as testified by insurance offices and banking houses, &c. “Commercially speaking,” said the consul, “the Philippine Islands are one of England’s good colonies.” After England comes, it seems, Germany, whose commerce with these islands has made the most remarkable progress in recent years; whereas, ten years ago her imports amounted to between 120,000*l.* and 160,000*l.* sterling (three to four million francs), they are now valued at 600,000*l.* (15 million francs) at the least. Germany, with whose products those of Austria should be classed, has made there a series of commercial conquests over all the other nations, over England in regard to iron, over Denmark in beer, Holland in paper, Sweden in matches, France in silks, hats, toys, &c. A large quantity of the products are sold under an English or French

mark, a manœuvre which would be called in military language a stratagem, but which bears in commerce another appellation. According to M. Crampon the exports of the United States to these islands are on the increase. Her sewing-machines (recently introduced there), watches of extraordinary cheapness, ingenious and cheap toys, and jewelry made of white metal are in growing demand. In her onward progress at Manilla the United States is entering into competition with nearly all the manufacturing countries, but especially with Germany.—In conclusion a paper was read by M. Germain Bapst upon Georgia, which he had just visited, and also on the neighbouring colonies.

— December 5th, 1884: M. BOUQUET DE LA GRYE, of the Institute, in the Chair.—In the hall there was exhibited a large manuscript map of Madagascar, drawn by M. Laillet, an engineer and architect. This map, which is on the comparatively large scale of 1:666,666, has been executed as regards the northern coasts on the basis of maps of French hydrography, while for the southern coast-line maps of English hydrography have been utilised. With regard to the interior of the island, M. Laillet has based his map on the works of the principal explorers and made use in particular of the large map of the late English missionary Dr. Mullens. The author himself, during his residence in Madagascar in 1875–6, made numerous surveys in that part of the island situated between Mananzari and Tamatave, and also along the course of the Manguru and its affluents. He has further been assisted by a large amount of information furnished by different residents in Madagascar.—Among the works presented to the Society, that of M. Désiré Charnay, which had just appeared in the Hachette library, on the ‘*Anciennes villes du Nouveau Monde*, should be noted. The author in making the presentation said that the book was the history of a civilisation too much disregarded and disowned, viz. that of the Toltecs. The theory of M. Charnay is well known. Contrary to the opinion of most archaeologists, he maintains that this civilisation is rather modern than otherwise, i. e. relatively modern. In his work M. Charnay commences with the Toltec at his origin in the eighth century at Tula, and follows him in his varied history and circumstances up to the zenith of his power and influence. The book is at once a scientific work and an account of travels.—The General Secretary then called attention to the work of Prince Roland Bonaparte, presented by the author to the Society. It was, he said, a volume “*de luxe*,” but possessed a real and valuable anthropological interest, being a treatise on the indigenous peoples of Surinam. The book, which was divided into three parts, dealing (i.) with the Indians, (ii.) with the negroes of the woods, (iii.) with those of the towns, was adorned with magnificent photographs reproduced by the phototype process. M. de Quatrefages, of the Institute, also dwelt upon the importance of this work.—Another presentation to which attention should be drawn, was an elementary atlas with maps in relief, by Mr. Henri Mager (Bertaux publisher). This was the first time that the relievio process, an imitation from the German, had been applied in France to an ordinary atlas.—The Minister of Foreign Affairs communicated two despatches from M. Ledoulx, French Consul at Zanzibar, one dated 13th and the other 23rd October. The consul had not as yet received any news of M. Giraud, and consequently was still in ignorance of the circumstances which led to the desertion of his porters. With regard to the deserters themselves, the consul had succeeded in securing the arrest and imprisonment of a certain number of them, but he was awaiting news from M. Giraud. The three chief men of the caravan, viz. Wadi Combo, Wadi Osmani, and Farradji, were among those in prison, and were accused with having murdered the couriers, burned the villages, and plundered the inhabitants of the districts which they traversed, and spread terror along their line of route. The example thus made would do good, for, unless some such steps were taken, the safety of explorers would be dangerously threatened

and the position of a European left alone without arms and provisions in the heart of Africa at a distance of hundreds of miles from the coast, would be intolerable. In his despatch of the 23rd October M. Ledoulx stated that the station of the Fathers of the Holy Spirit at Mrogoro, which was founded scarcely two years ago at much expense and trouble, had just been burned to the ground. All the outhouses had been destroyed together with large stores of provisions. This sad calamity would undoubtedly retard the establishment of the new station, which the Fathers had hoped to complete by the end of the year. It should be stated, however, that this fire was not the result of malevolence. The Queen Simba Moueni herself assured the consul of this during a visit which she had made to Zanzibar. This princess, acting on the advice of the missionaries, had offered most praiseworthy opposition to the sacrifice of human beings, so common only a year ago in her dominions.—Mr. Hore, head of the English station on Lake Tanganyika, who, as M. Ledoulx reminded the Society, rendered such kind assistance to the lamented Abbé Debaize during his last moments, was stated to have just started for Ujiji at the head of a considerable caravan. He had taken with him his wife, his young child, and two young missionaries, who were going to assist him in his work.—A French Protestant missionary M. Ernest Jacottet, in the country of the Basutos, sent an account of a week's journey made by him in the district between Morija and Paballong (East Griqualand), across the mountainous group separating Lesuto from Natal. This, said the Secretary, was a very clear narrative of an excursion in a new country, and it gave an intelligible idea of the basin of the Upper Orange or Senku river, the more valuable because the author was evidently a man of observation and sagacity. The region traversed by M. Jacottet and his companion M. Dyke was before wholly unexplored, only a few white men having ever crossed these mountains previously. Certainly no one had ever followed the route taken by the missionaries, and at all events not a single traveller had made known to the public what he had seen. Our maps also had never been accurate as regards the basin of the Upper Orange or Senku river, and this was not to be wondered at, considering the fact that the authors were totally ignorant of the hydrography and orography of the region. The chain of the Maluti Mountains, crossed by the travellers, was in many respects more broken than the Alps. One might march sometimes for several hours at a stretch along lofty precipices. The waters being low at the time of this journey, the two missionaries met with no obstacles in that direction, and it was only on their return, when crossing the Sebapalu, that they recognised which were the large rivers in the country. In point of grandeur, the falls of the Maletsunyane exceeded all other spectacles. "They were truly magnificent," said the correspondent. For three or four years the upper valleys of the country had been inhabited, in spite of the coldness of the climate, and the difficulty of the approach to this particular part. The travellers found villages everywhere along the rivers. Formerly a few Bushmen were the only inhabitants. These mountains form, according to M. Jacottet, an outlet for the surplus population of Lesuto, but there are certain places where the caffre-corn does not grow, which are uninhabited and uninhabitable. In summer only they serve as pasture-grounds. Game in the mountains is plentiful enough, antelopes abound, and there are some elks. It is even said that near the sources of the Orange river lions are to be met with. With regard to the hydrography and orography of the chain described by M. Jacottet, it was stated that his letter would be inserted *in extenso* in the account of the Proceedings of the Society.—Several maps were received from Commander Roudaire, who was still away from Paris completing his final preparations for the journey which he was going to undertake, as recently announced by M. Lesseps (the object of this journey is the construction of a

harbour in the Bay of Gabes, which will possibly hereafter serve as an opening for the introduction of the sea into the interior of Africa). These maps were comparative ones of the Chotts, and from an examination of them it results, according to him, that the lakes of Lybia, Pallas, and Triton occupied exactly the site of the Chotts Melrir, Rharoa, and Djerid. The mouth of the river Triton is situated very nearly 10 miles (16 kilometres) from Tacapa, exactly at the spot where Oued Melah ends, which would be the point of departure of the canal to supply this proposed inland sea, the favourite scheme of M. Roudaire.—In conclusion, a paper was read by M. Soleillet on South Abyssinia.* M. Soleillet, who had the same morning been decorated with the Legion of Honour, was warmly congratulated by the Chairman.

NEW BOOKS.

(By E. C. RYE, *Librarian R.G.S.*)

ASIA.

Benndorf, Otto, & Niemann, George.—Reisen in Lykien und Karien, ausgeführt im Auftrage des k.k. Ministeriums für Cultus und Unterricht unter dienstlicher Förderung durch seiner Majestät Raddampfer "Taurus," Commandant Fürst Wrede, beschrieben von Otto Benndorf und George Niemann. Wien (Carl Gerold's Sohn): 1884, fo., pp. 158, 49 full-page photographic illustrations, 89 minor illustrations in text; map. (*Williams & Norgate*: price 7l. 10s.)

This magnificently illustrated volume forms vol. i. of 'Reisen im Südwestlichen Kleinasien,' undertaken at the expense of the Austrian Ministry of Public Instruction, and of which a second volume is notified as in preparation by Eugen Petersen and Felix von Luschan, to be apparently of more extended scope. The careful examination, description, and pictorial rendering by the authors, of ruins, sculptures, inscriptions, and other objects of historical importance, will render this work of lasting value to archaeologists. It also contains some topographical notes, and is further illustrated by a map (scale 1:300,000) in Kiepert's best style, showing the routes not only of the members of the present expedition, but of their more eminent predecessors. Most of the photographs are deserving of the highest praise.

Henderson, [Rev.] Archibald.—Palestine. Its Historical Geography, with topographical Index and Maps. Edinburgh (T. & T. Clark): 1885, post 8vo. pp. ix. and 221, maps and plan. Price 2s. 6d.

The maps are from Conder's 'Handbook to the Bible,' and the text is mainly based on the trustworthy work of the Palestine Exploration Fund and its officers. The topographical Index gives biblical references and short modern definitions.

Midden Sumatra.—Reizen en Onderzoekingen der Sumatra-Expeditie, uitgerust door de Aardrijkskundig Genootschap, 1877-1879, beschreven door de leden der Expeditie, onder toezicht van Prof. P. J. Veth. IV. 4de. Afl. Natuurlijke Historie, door Joh. F. Snelleman. Met medewerking van vele Buiten- en Binnenlandsche Geleerden. Leiden (E. J. Brill): 1884, sm. 4to.

See 'Proc. R.G.S.,' 1881, p. 441, for notice of the continuation to that date of this descriptive and illustrative account of the Dutch Expedition of 1877-79 to Central Sumatra. The Natural History section alone has for over three years delayed the completion of the work, and is very nearly concluded by the present instalment, which contains pp. 9-58, completing Pt. 1, Mammals (with

* See 'Quarterly Bulletin.'

pl. i.) and Birds; Pt. 2, pp. 15-20, supplementary observations on Reptiles and Fishes; Pt. 5, pp. 23-26 and pl. vii. and viii., completing the Neuroptera; Pt. 6, pp. 73-180, of Coleoptera, of which more text and two plates are yet to come; Pt. 7, pl. i. of Lepidoptera, with more to come; Pt. 12, Vermes, by Dr. R. Horst, pp. 1-14, and pl. i. (pl. ii. to come); Pt. 13, Botany, pp. 1-50 and four pls.; title, preface, contents, and index, and Pt. 13 c, pp. 1-4. The Botanical portion is apparently to be more exhaustively treated in a separate work, to be entitled 'Bijdragen tot de Kennis der Flora van Midden-Sumatra.'

Radloff, [Dr.] Wilhelm.—Aus Sibirien. Lose Blätter aus dem Tagebuche eines Reisenden Linguisten. Leipzig (Weizel): 1884, 2 vols. 8vo., pp. 536 and 488, map, coloured frontispiece and illustrations. (*Williams & Norgate*: price 14s. 6d.)

A collection of essays, chiefly with a linguistic object, containing a geographical and statistical sketch of Western Siberia and its southern confines, journeys in the Altai and eastern Kirghiz Steppe, the races of Southern Siberia and Dzungaria, the eastern non-Mahomedan Turkish races of Western Siberia, the Turkish Steppe-nomads, Shamanism and its followers, Siberian ancient remains, a Journey to the Chinese boundary and in Western Mongolia, with mention of local trade relations between Mongolia and Russia, the valley of the Ili, and the central Serafschan valley. The author's journeys seem to date from 1860. His map is from Stieler's Hand-atlas, on too small a scale (1:20,000,000) to be of very much use, and the illustrations are mostly ethnological. The want of an index deprives this work of much of its value as a store-house of facts and references.

AFRICA.

Boddy, [Rev.] Alexander A.—To Kairwân the Holy: Scenes in Muhammedan Africa. London (Kegan Paul, Trench & Co.): 1885, post 8vo., pp. xv. and 275. map and illustrations. Price 6s.

The author (who spoke briefly on the subject of his visit during the discussion following Mr. E. Ræ's paper on Kairwân read before Section E of the 1883 meeting of the British Association at Southport) gives the details of his experiences during a stay in the Holy City in the same year. An account of Miss Tinne's wanderings in North Central Africa is given (p. 58 *et seq.*), from the mouth of her former attendant Abdullah, who was also with the late Capt. Gill. Mr. Boddy appears to have been the first Christian minister who has actually entered the Mosque, of which he supplies some additions to Mr. Ræ's description in 'The Country of the Moors.'

Bouche, [L'Abbé] Pierre.—Sept Ans en Afrique Occidentale. La Côte des Esclaves et le Dahomey. Paris (Plon): 1885, 12mo., pp. viii. and 403, map. (*Dulau*: price 3s. 6d.)

The author spent seven years as a missionary on the Slave Coast, having lived in 1866 at Porto Novo, and afterwards at Wydah, Lagos, and Agowé. He here gives the results of experiences derived in his varied capacities as instructor, physician, and apostolical minister,—his information being necessarily more of ethnological than geographical interest, though there are special chapters on coasting voyages, excursions, and the geography of Dahomey. The map is original, but a mere outline.

Gallieni [Joseph Simon].—Mission d'Exploration du Haut-Niger. Voyage du Soudan Français (Haut-Niger et Pays de Ségou), 1879-1881, par le Commandant Gallieni. Paris (Hachette): 1885, imp. 8vo., pp. 652 [no index], maps, plans, and illustrations. (*Dulau*: price 12s. 6d.)

Practically a republication of articles in the *Tour du Monde* by the same publishers, vol. xlv., 1883. The route of the Mission up the Senegal to Medineh, Bafulabeh, and Kita, and thence to the Upper Niger at Bamako and Segou-Sikoro, is shown on a sketch map (scale 1:7,000,000), and also given from Medineh on a larger scale (1:800,000), with various insets of details on a still larger scale, views of prominent points, a hypsometrical profile, and a general

map of commercial routes in the Western Soudan. Nearly 150 illustrations are given in the text, many of which are more or less geographical; and the book contains a map of details on the Senegal and Upper Niger and their people, which would be much more accessible by the addition of an index.

AMERICA.

Colange, L. de.—The National Gazetteer. A Geographical Dictionary of the United States, compiled from the latest official authorities and original sources. Embracing a comprehensive account of every State, Territory, County, City, Town and Village throughout the Union, with populations, from the last National Census . . . with all useful information pertaining to Railroads, Navigation, Lakes, Rivers, Canals, Mountains, Valleys, as well as the Physical and Statistical Geography of the Country. London (Hamilton, Adams, & Co.): 1884, large 8vo., pp 1125, in double column. Price 21s.

The editor gives in the preface the chief official and other sources of information from which he and his assistants have obtained the details of over 75,000 places.

[Egyptian Sûdan.]—Report on the Egyptian Provinces of the Sûdan, Red Sea, and Equator. Compiled in the Intelligence Branch, Quartermaster-General's Department, Horse Guards, War Office. Revised up to July 1884. London (W. Clowes & Sons, and other booksellers: price 3s. 6d.): [1884], sm. 8vo., pp. 275, map.

This report, which, at the present time will be found of great interest, commences by giving an historical sketch of the events in the Sûdan: beginning with the annexation of Nubia in 1821-22, and bringing us down only to the end of 1882; the more recent political and military occurrences being omitted. This is followed by a general description of the Egyptian Provinces of the Sûdan, the Nile and the Equator, with especial reference to tribal distinctions, general resources, food, and water-supply, products, and climatic considerations. The Report on Towns includes only those of primary importance, viz. Khartûm, El-Obeiyad, Bara, Suâkin, El-Fasher, Kassala, Massuah, Keren, and Debbah; places of minor interest are noticed in other parts of the volume.

The Nile with its tributaries is next considered in respect to its navigability and general adaptability as a waterway; followed by some useful statistical and general information relating to Postal and Telegraph services, the districts subject to special local diseases affecting horses and cattle, finance and trade, the projected Sûdan railway, and desert travelling. The question of communications is next dealt with, descriptions of the various routes from Lower Egypt and the Red Sea are given in detail; while in order to prevent any inconvenience likely to arise, owing to the details of these routes, being extracted from the notes of different authors and travellers, differing in some respects, a summary in such cases is given, and these summaries, with the addition of certain new routes and some further information on some of those already described, are arranged in the form of addenda to the chapters to which they refer. Separate chapters are devoted to giving detailed descriptions of the desert routes in the Western, Southern, and Equatorial Provinces.

The map (scale 1 : 2,253,080 or 35·56 miles to 1 inch) represents the Egyptian Sûdan and contains two inset maps—one of Khartûm and Environs (scale 1 : 40,000 or 1·584 inches = 1 mile); the other of Egypt Proper, Nubia, and the Egyptian Sûdan (scale 1 : 6,336,000 or 100 miles = 1 inch).—**[V. S. B. H.]**

NEW MAPS.

(By J. COLES, *Map Curator R.G.S.*)

WORLD.

Supan, A.—Karte der Jahres-Isothermen. Equatorial scale 1:30,000,000 or 411 geographical miles to an inch. Mercator's Projection. Verlag von Ed. Hölzel in Wien. 1884. (*Dulau.*)

EUROPE.

Attika.—Karten von—, auf Veranlassung des Kaiserlich Deutschen Archäologischen Instituts und mit Unterstützung des Königlich Preussischen Ministeriums der Geistlichen, Unterrichts- und Medicinal-Angelegenheiten. Aufgenommen durch Offiziere und Beamte des k. Preussischen Grossen Generalstabes; mit erläuterndem Text herausgegeben von E. Curtius und J. A. Kaupert. Heft III. Dietrich Reimer, Berlin, 1884.

Belgique, La.—Carte d'emplacement des forces militaires de la Belgique en temps de paix. Bruxelles, 1884. Price 5s. (*Dulau.*)

France.—Carte de—, dressée par le Service Vicinal par ordre de M. le Ministre de l'Intérieur. Scale 1:100,000 or 1·3 geographical miles to an inch. Paris, Hachette et Cie., 1884. Sheets:—XI. 17. Sablé. XI. 18. Durtal. XI. 19. Angers. XI. 20. Doué. XI. 21. Bressuire. XI. 22. Parthenay. XI. 23. Niort. XI. 24. Aulnay. XII. 10. Le Havre (nord). XII. 11. Le Havre (sud). XII. 14. Argentan. XII. 15. Alençon. XII. 16. Le Mans (nord). XII. 17. Le Mans. (sud). XII. 18. La Flèche. XII. 19. Saumur. XII. 20. Chinon. XII. 21. Mirebau. XII. 21. La Motte-Saint-Héray. Price of each sheet 7d. (*Dulau.*)

Hungary.—Ethnographische Karte der Länder der Ungarischen Krone, auf Grund der Volkszählung von 1880 von Ignaz Hatsek, königl. ung. Kartograph. Scale 1:4,000,000 or 55·5 geographical miles to an inch. Petermann's 'Geographische Mitteilungen,' Jahrgang 1885, Tafel 3. (*Dulau.*)

Italy.—Die Italienische Gesamtauswanderung des Jahres 1883. Nach offiziellen Angaben entworfen von Dr. R. Lüddecke. Scale 1:5,000,000 or 66·6 geographical miles to an inch. Petermann's 'Geographische Mitteilungen,' Jahrgang 1885, Tafel 2. Justus Perthes, Gotha. (*Dulau.*)

Oesterreich-Ungarischen Eisenbahnen.—Die—, der Gegenwart und Zukunft. Karte zur Reise so wie zur Uebersicht der befahrenen, in Bau befindlichen, concessionirten und projectirten Eisenbahnen, nebst deren eigenthümlichen Benennungen. Erneute Ausgabe mit 3 Beikarten: Das Nordböhmische Eisenbahnnetz.—Umgebung Wiens.—Die Orient-Anschlüsse. Wien, Artaria & Co., 1885. Price 2s. 6d. (*Dulau.*)

Oesterreichsch-Ungarischen Monarchie.—Spezialkarte der—. Scale 1:75,000 or 1 geographical mile to an inch. K. k. militär-geografisches Institut. Wien, 1884. Sheets:—Zone 10, Col. XVI. Göding und Lundenburg. 11, XVI. Landshut, Schosberg und Hohenau. 12, XVI. Dürnkrot und Bösing. 15, XVIII. Acs und Totis. 15, XIX. Neszmély und Zsámbék. 15, XX. Alt ofen (Budapest). 16, XIX. Bicsko und Mártonvásár. 16, XX. Budapest und Tétény. 17, XIX. Stuhlweissenburg und Seregélyes. 17, XX. Rác-Adony und Kun-Szt-Miklós. 20, XIX. Szégszárd. 21, XXVII. Körösbánya. 22, XX. Zombor. 23, XXVI. Lugos. 23, XXVII. Ruskberg (Ruszahegy). 24, XXV. Gattaja

und Dognácska. 25, XXV. Kudritz und D-Oravica. 25, XXVI. Krassova und Teregoava. 25, XXVII. Korniareva. 26, XXI. Mitrowitz. 26, XXVII. Mehadia. 28, XIV. Gracac und Ermain. 29, XIV. Knin und Ervenik. 33, XIII. I. St. Andrea. 34, XIV. I. Busi. Price 1s. 4d. each sheet. (*Dulau.*)

Oesterreich-Ungarn.—Eisenbahn-Karte von——. Scale 1:800,000 or 10·9 geographical miles to an inch. Hülzel, Wien, 1885. Price 2s. (*Dulau.*)

Sachsen.—Topographische Karte der Königreich——. Bearbeitet im topograph. Bureau d. Königl. Generalstabes. Scale: 25,000, or 2·9 inches to a geographical mile. Lieferung 11, enthaltend Blätter: 7. Kleintrebnitz. 8. Spansberg. 9. Forsthaus Pfeife. 17. Collnitz. 18. Skässchen. 32. Hirschstein. 33. Grossenhain. 49. Kötzschenbroda. 67. Pillnitz. 69. Neustadt. 70. Schirgiswalde. 86. Hinterhermsdorf. 87. Seiffennersdorf. 105. Am Raumburg. 106. Waltersdorf. Leipzig. Price 1s. 6d. each sheet. (*Dulau.*)

ORDNANCE SURVEY MAPS.

Publications issued from 1st to 31st December, 1884.

1-inch—General Maps:—

SCOTLAND: Sheets 50, 59 (in outline and with contours); 1s. 9d. each. 80 (in outline), 99 (outline completed); 1s. 9d. each. 114 (with hills); 1s. 9d.

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ENGLAND AND WALES: **Glamorganshire:** Sheet 16; 2s. 6d. **Hertfordshire:** 19; 2s. **Oxfordshire:** 46, filled in with 11 (Berkshire); 2s. 6d. Quarter Sheets:—**Bedfordshire:** 33 N.W., 33 N.E., 33 S.W.; 1s. each. **Brecknockshire:** 32 N.W.; 45 N.W., 45 N.E., 45 S.W., 45 S.E.; 50 N.W., 50 N.E.; 51 N.W.; 1s. each. **Derbyshire:** 19 S.E.; 26 N.E., with 17 N.E. (Nottinghamshire); 26 S.E., with 17 S.E. (Nottinghamshire); 31 S.E. with 22 S.E. (Nottinghamshire); 1s. each. **Devonshire:** 27 N.E.; 78 S.W.; 132 S.W.; 1s. each. **Herefordshire:** 2 S.E.; 7 N.E. with 82 N.E. (Shropshire); 1s. each. **Merionethshire:** 16 N.W., 16 N.E., 16 S.E.; 1s. each. **Montgomeryshire:** 43 N.W., 43 S.W.; 49 N.W.; 1s. each. **Northamptonshire:** 47 N.W., 47 N.E.; 1s. each. **Nottinghamshire:** 19 N.E., 19 S.E.; 20 N.W., 20 N.E. with 68 N.E. (Lincolnshire), 20 S.W.; 35 N.E.; 1s. each. **Shropshire:** 14 S.E.; 15 S.W.; 21 N.E.; 22 N.W.; 27 N.E., 27 S.E.; 28 N.W.; 34 N.E., 34 S.W.; 79 N.W.; 1s. each. **Staffordshire:** 31 S.E.; 46 S.W.; 49 N.W.; 1s. each. **Suffolk:** 47 N.W.; 53 N.E., 53 S.E.; 56 N.W.; 60 S.E.; 66 S.W., 66 S.E.; 74 S.W.; 76 S.W.; 83 N.W.; 1s. each. **Worcestershire:** 19 S.W.; 38 N.E.; 42 S.W.; 1s. each.

IRELAND: **Meath** (revised), sheets 32, 33, 45, 51.

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SCOTLAND: **Elgin:** Dyke and Moy, 1.

Town Plans:—5 feet scale:—

IRELAND: Rathmines and Rathgar (co. Dublin), 20 sheets; 2s. each.

ASIA.

Annam et Tonkin, à l'échelle de 1 : 1,600,000 or 27·3 geographical miles to an inch. Andriveaux-Goujon, Paris. (*Dulau.*)

Tibet.—Reiserouten des Indischen Punditen A—K— in Gross Tibet und der Mongolei 1879–82 zusammengestellt von G. W. E. Atkinson. Scale 1 : 3,000,000 or 41·6 geographical miles to an inch. Petermann's 'Geographische Mittheilungen,' Jahrgang 1885, Tafel 1. Justus Perthes, Gotha. (*Dulau.*)

AFRICA.

Central Afrika.—Karte von—— zur Veranschaulichung des unter das System der Handelsfreiheit zu stellenden Congo-Beckens für das Auswärtige Amt bearbeitet und gezeichnet von L. Friederichsen. Hamburg, 1885.

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Westafrikanischen Küstengebietes, Specialkarte des—— zwischen dem Alt Calabar Fluss und Corisco Bai (Kamerun, Biafra, Batanga, etc.). Scale 1 : 780,000 or 10·6 geographical miles to an inch: zur Veranschaulichung der unter Deutsche Schutzherrschaft gestellten Länderstrecken. Auf Basis offizieller Deutscher, Englischer und anderer Materialien für das Auswärtige Amt bearbeitet und gezeichnet von L. Friederichsen. Hamburg, 1885. Price 1s. 6d. (*Dulau.*)

AUSTRALASIA.

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Edward Stanford

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A Recent Exploration of the King Country, New Zealand.

By J. H. KERRY-NICHOLLS.

(Read at the Evening Meeting, February 23rd, 1885.)

Map, p. 272.

Introduction.—That part of the North Island known as the King Country extends from lat. 38° to $39^{\circ} 20'$ S., and from long. $174^{\circ} 20'$ to 176° E. Its area as well as can be defined is equivalent to about 10,000 square miles. The *aukati* or sacred boundary-line of the Maoris separating it from the European portion of the colony will be seen coloured red on the map. The physical features of this vast region present not only many beauties, but many natural advantages for European settlement, while it is one of the best watered parts of the island. In its southern portion the Whanganui passes through it, fed by many tributaries flowing from the high mountain ranges both in the southern and central divisions of the island. In the west the Maukau river and its affluents flow from its central region to the coast. In the north the Waipa, Puniu, Waipari, Waipapa, and other streams having their sources in the Titiraupenga and Rangitoto Mountains, wind through it to the Waikato river; the high wooded ranges of the central tableland form the sources of many watercourses disemboguing into Lake Taupo, while in the south-east the snow-clad heights of Tongariro and Ruapehu pour down their rapid waters in a perfect network of creeks and rivers. In the west it has an extensive coast-line, and it possesses one of the largest harbours in the island. Dense forests cover a large portion of its southern area and extend northerly over the broken ranges of the Tuhua to Mount Titiraupenga, and the Rangitoto Mountains. Westward of this division there is a considerable area of open country, including the valley of the Waipa, which in its turn is bounded on the west by high fern-clad hills and wooded ranges. In the vicinity of the high snow-clad mountains in the south there are vast open tablelands, while immediately to the west of Lake Taupo and north of Titiraupenga to the banks of the Waikato there are again extensive open plains.

Geologically considered, the King Country possesses all the rock formations or strata in which gold, coal, iron, and other minerals are found, while its extensive forests are rich in timber of the most varied and valuable kind. Geysers and thermal springs possessing wonderful medicinal properties are found in the vicinity of its many extinct craters ; and while it possesses one of the largest active volcanoes in the world, its grand natural features are crowned by the snowy peaks of some of the highest mountains of Australasia. In the north the trachytic cones of Titiraupeunga and Perongia rise to an elevation varying from 3000 to 4000 feet ; near to its western boundary the snowy peak of Taranaki or Mount Egmont attains to an altitude of 8700 feet ; on its eastern confines the rugged crater of Tongariro sends forth its clouds of steam from a height exceeding 7000 feet, while on its southern side the colossal form of Mount Ruapehu rears its glacier-crowned summit to an altitude of over 9000 feet above the level of the sea. With these important features Nature has endowed it with scenery of the grandest order and with a climate unsurpassed for its variety and healthfulness.

The political state of the King Country forms one of the most interesting chapters in the history of New Zealand. In 1840 the colony was founded. In this year the treaty of Waitangi was signed, and by it the Maoris ceded all the rights of sovereignty to the Queen, and her Majesty confirmed and granted to the chiefs and tribes exclusive possession of their lands. In 1854 the native chiefs, seeing that their *mana* or authority over the tribes decreased with the advance of European settlement, convened a great tribal gathering, at which it was decided that the sacred mountain of Tongariro should form the centre of a district in which no land should be sold to the Government, that no roads should be made by the Europeans within the area, and that a king should be selected to reign over the Maoris. These resolutions were all eventually carried out. After the war in 1863-64 Te Kooti, the principal rebel leader, with his marauding bands and many of the tribes then in rebellion withdrew into the territory now known as the King Country ; the *aukati* or sacred boundary-line was drawn, and the Hauhaus—the native name by which the rebel Maoris were known—forbade, under penalty of death, the entrance of Europeans into their country.

In undertaking my journey of exploration I was prompted by no other desire than to make known more fully that portion of the colony which was virtually a blank on the maps. The object was, in fine, of a purely scientific nature, and was prosecuted solely in conformity with that view, and entirely on my own responsibility ; since, owing to the complicated phases of the Maori question, I found that I could get no support from the Government until I had successfully carried out my object. Owing to the hostility of the natives the difficult point was to decide how the journey could be best set about. The matter was laid

before Sir George Grey—late Governor of the colony; and he with a ready desire to promote the object wrote a letter of introduction in my behalf to Tawhiao, the Maori king, asking him to grant me his *mana* or authority to travel through the Maori territory. The letter was presented at a moment when the native mind was much disturbed in connection with the political relationship existing between the Maoris and the Europeans, and the king advised me not to set out on my journey at that time. I made no further appeal to Tawhiao; but I determined that if I could not get into the King Country at the north, I would do so at the south, and on the 8th March, 1883, I left Auckland for Tanranga to explore the country at my own risk.

Some of the most interesting results of the exploration may be summarised as follows:—

Up to the time of my making the journey, the King Country, owing to the obstruction of the natives, had never been surveyed, and consequently many of its remarkable geographical and geological features had remained but imperfectly known, the existing maps of this part of the colony being mere outlines. From the commencement of my journey I therefore adopted a system of barometrical measurements and topographical observations, and thus secured a supply of information which I mapped out from day to day, while the names of mountains, rivers, plains, and other features of topographical importance were obtained from the natives by my interpreter. Altogether we accomplished over 600 miles of travel—with three horses ultimately reduced to two; found twenty-five rivers not previously shown on the maps, with two small lakes; examined the hydrography of Lake Taupo in relation to the four distinct watersheds flowing into that lake; traced the sources of four of the principal rivers of the colony, viz. the Whanganui, Waikato, Whangaeahu, and Manganui-a-te-Ao; ascended Tongariro (7300 feet) and examined its active crater; ascended Mount Ruapehu (9000 feet), the highest peak of the North Island; traced the principal mountain ranges forming the central division of the King Country; ascended the Kaimanawa Mountains to an altitude of 4000 feet, and found the geological formation to be indicative of auriferous and other metalliferous deposits; fixed the altitude of 100 different points throughout the journey, from sea-level to over 9000 feet above that standard—by this table the configuration of a large portion of the island may be arrived at.* During the journey I had an opportunity of examining the varied flora of this division of New Zealand, and I obtained some of the choicest specimens of Alpine plants and obtained their native names from the Maoris. I secured specimens from the highest altitude attained by plant life in

* The various altitudes above sea-level of the country traversed will be found in the table on the map, and the numbers of which correspond to those marking the camping-places and principal stations of observation along the route.

the North Island, in the *Gnaphalium bellidioides* and the *Ligusticum aromaticum*. It is remarkable that the Maoris could give us no native names for these two plants.

In thus referring to what I have done in connection with travel in New Zealand, it is a pleasing duty for me to make at least a passing reference to others who have laboured in the same field. At the head of the list as an explorer and author stands Sir George Grey, at one time a Vice-President of this Society, and who during the period of his governorship of the colony did much in the cause of travel in many parts of both islands, and rescued from oblivion some of the finest poetry and most valuable traditions of the Maori race. In the early days of the colony, at a time when the Maoris were ready to welcome Europeans, Ferdinand von Hochstetter, a member of the Austrian *Novara* Expedition, travelled through a large portion of the North and South Islands, and published a very valuable work upon his explorations. At the present day Dr. Julius von Haast—a Gold Medallist of this Society—has done great work in connection with scientific research, especially in the Middle Island. Dr. James Hector has laboured long and earnestly in the Geological Department of the colony. Again, the Survey Department has been for many years carried on in a very able way under Mr. James McKerrow and Mr. Percy Smith. This branch of the civil service has had many difficulties to contend with, owing in many instances to native obstruction, as well as to the rugged and mountainous character of a great portion of the colony. I may also here point out that about a year subsequent to my journey through the King Country the Government obtained permission from the native chiefs to allow a flying survey to be made for a proposed line of railway through the Maori country, and since that time a triangulation of a portion of the King Country has been effected.

In setting out upon the undertaking, as I had resolved to travel without the assistance of friendly natives, whose aid it would have been impossible to obtain, and as I could not speak the native language, I had to secure the services of an interpreter. In this I was fortunately successful in the person of Mr. J. A. Turner, a half-caste youth, to whose intelligence and good-fellowship I owe much of the success of my journey. Like myself, he had not before travelled through the country we intended to explore. We were each mounted, and our tent and what little provisions we could carry were placed on a third horse, which unfortunately broke down through overwork and privation before our journey was half completed. We started from Tauranga, examining the lakes and hot springs on our way, and on the 5th of April made a final departure for the King Country, from the extensive geyser and hot-spring region of Wairakei.

The Native Race.—There can be no doubt whatever that the Maori race is greatly on the decrease. In Cook's time (1769) the whole native

population was estimated as exceeding by a little 100,000, but I am of opinion that this was a very low estimate for that period. In 1859 it only amounted to 56,000; of this number 53,000 fell to the North Island and only 2283 to the Middle Island. In 1881 the number had decreased to 44,099, of which 24,370 were males and 19,729 females. The three principal diseases conducing to the decay of the race I found to be phthisis, chronic asthma, and scrofula, the first two being principally brought about, I believe, by a half-savage half-civilised mode of life, and the latter from maladies contracted since the first contact with Europeans. It is, however, clear that there is a large number of natives yet distributed throughout the King Country, and among them are to be found, as of old, some of the finest specimens of the human race. A change of life, however, so different from that followed by their forefathers has brought about a considerable alteration for the worse among the rising population, and although during my journey I met and conversed with many tattooed warriors of the old school, who were invariably both physically and mentally superior to the younger natives, it was clear that this splendid type of savage will soon become a matter of the past. I found the natives living much in their primitive style, one of the most pernicious innovations, however, of modern civilisation amongst them being an immoderate use of tobacco among both old and young. Although most of the native women were strong and well-proportioned in stature, and apparently robust and healthy, there appeared to be a marked falling off in the physical development of the younger men when compared with the stalwart muscular proportions of many of the older natives—a result which may, no doubt, be accounted for by their irregular mode of life when compared with that usually followed by their forefathers, combined with the vices of civilisation, to which many of them are gradually falling a prey.

The Region of Lake Taupo.—This region is formed of an extended tableland which towards its central point, that is to say in the vicinity of the lake margin, attains to a mean altitude of nearly 2000 feet above the level of the sea. Beyond this inner circle of the great lake basin, the plane of elevation varies in altitude, and attains its highest point at its southern division, where, on the Onetapu desert at the eastern base of the great mountain Ruapehu, it rises to a height of 3000 feet, from which place it inclines gradually towards the south coast, and divides the northern and southern watershed of this portion of the country. Easterly of this the tableland is intersected by the Kaimanawa Mountains, and from the western base of Ruapehu it falls with a rapid descent into the valley of the Whanganui. To the north of the lake along the upper valley of the Waikato it has an average elevation of from 1500 to nearly 2000 feet, until it descends into a broad valley near Atea-Amuri, where the Waikato river flows to the north-west to enter the plains of its lower valley. Eastward of the lake

the highest point of the plateau is attained near to the northern slope of the Kaimanawa Mountains, where it dips in a north-easterly course in the direction of the Bay of Plenty. Over a large area along the western shore of the lake, the tableland maintains a more equal elevation than near the eastern shore-line until it reaches the head of the Waihora river, whence it inclines north-westerly around the high mountains of Titiraupenga, until it gradually merges into the broad low valley of the Upper Waipa.

It is as near as possible in the centre of this vast area of elevation that the enormous sheet of water forming Lake Taupo is situated. Its superficial area is over 300 square miles, and its mean altitude by barometrical measurement I found to be 1·175 feet. The margin or shore-line assumes a somewhat oval shape, with a broad bay on the western side. It possesses one small island situated near to its south-eastern shore, and its coast is varied with beautiful bays and headlands which in some instances rise many hundreds of feet above the white pumice shore. Although the waters of the lake are comparatively shallow around a greater part of its margin, there are places where it is of enormous depth, especially near its centre in the direction of the western bay.

In describing the hydrography of this wide region, the area of the lake basin may be defined by those divisions of the country which give rise to the rivers, creeks, and other waters flowing into it, and which have their origin for the most part in the extensive mountain ranges scattered over various parts of the tableland. Although on the most recent maps of the colony only about eight rivers are represented as flowing into the lake, I found on the western shore, in addition to other smaller streams, the Kuramanga, Kuratao, Whareroa, Mangakara, Whanganui,* Waikino and Waikomiko, besides three other streams on the northern shore, the names of which I was unable to ascertain.

It will therefore be seen that there are not less than seventeen rivers running into this lake, with innumerable smaller streams; while it should be remarked that the only river or stream of any kind flowing out of this immense area of water is the Waikato at the north-east end. Most of the rivers on the eastern side of the lake receive their waters from the north-western slope of the Kaimanawa Mountains, and those from the west from the Tuhua Hauhungaroa and Hurakia ranges; comparatively little water flows into the lake at the northern end, since the country thereabouts dips mostly in the direction of the valley of the Waikato. It is, in fact, at its southern end that the lake receives its greatest volume of water from the Upper Waikato river and its tributaries. This river, rising at an altitude of 7000 feet on the eastern side of Ruapehu, is fed by the snows of that mountain and of

* This river is distinct from the large river of that name flowing to the south, and which has no connection with the lake.

Tongariro, as well as by the enormous watershed of a large portion of the Kaimanawa Mountains, along the western base of which it runs in its winding course to the lake, receiving likewise on its way the eastern streams of the Kakaramea ranges and the overflowing waters of Lake Rotoaira as they descend by the Poutu river. The waters of the lake rise rapidly during the rainy season; while, with the continuance of heavy winds, its waves are lashed into fury, and break upon its shores with the force and roar of a raging sea.

The existence of a body of water of the area of Lake Taupo, and of its form and depth in the centre of this elevated region, may be accounted for in several ways. It may have originated in the terrific throes of an earthquake, or by a fracture or break in the plateau. I am, however, of opinion that the present basin of the lake was at one time an active crater, which had its existence long prior to the period when the volcanic cones surrounding it sprang into existence, and that at the time of its activity it was considerably higher than it is at the present day; its subsidence or depression having been caused by one of those sudden changes peculiar to regions subject to volcanic disturbance. From every outward indication it would appear that the vast deposits of pumice rock so widely distributed over this portion of the tableland had their origin in the once active crater forming the basin of the great lake, and that both the volcanoes of Ruapehu and Tongariro rose above their still higher planes long after the period when the great Taupo crater—now forming the cup of the great lake—was the principal outlet of subterranean fires in this wide field of volcanic action.

The *fauna* of the lake, so far as it is at present known, is not extensive, although a system of dredging in its deep waters might bring to light interesting and perhaps new forms of life. The largest indigenous fish is the *inanga* * of the natives, about 6 inches long. It is the *Galaxias brevipinnis*, and is characteristic of the fresh-water *fauna* of the Antarctic zone, the genus being represented by several species in temperate Australia, New Zealand, Tasmania, Tierra del Fuego, and Patagonia. There are likewise two smaller fish, the *koaro*, about 3 inches long, common to Lake Taupo and to Lake Rotoaira, and the *kakopu*, a scaleless and still smaller fish. There is also a crawfish, *Paranephrops planifrons*, a form characteristic of New Zealand; this species, which is abundant in the lakes and rivers of the North Island, is represented in the South Island by *Paranephrops setosus*. It is named *koura* by the Maoria, and is much esteemed as an article of food. Although eels abound in all parts of the island, there are none to be found in the waters flowing into Lake Taupo. The fresh-water shells are represented by

* Specimens of the *inanga* and *koura* were obtained from the lake and brought with me to England and submitted for examination to Dr. A. Gunther, to whom I am indebted for their names and distribution.

Unio cyclus and a small species of *hydrobia*, the two former kinds being common on the western shore of the lake. There is a small graceful gull called by the natives *tarapunga*; the head, breast, and under part of the body of this bird are snow white, the wings of a light grey tipped with black, and the tail white and grey with black horizontal bars. The lake is at all times frequented by large flocks of wild duck, and by other aquatic fowl common to the North Island. The only representative of reptilian life I found in the vicinity of the lake was a small brown lizard about 2 inches long.

There are several centres of thermal action within the immediate regions of Lake Taupo, and both at its northern and southern end considerable areas of country are covered with geysers, solfataras, fumaroles, and hot springs in a very active condition.

Northern End of Lake Taupo.—Wairakei forms one of the principal seats of thermal action, which would seem to extend with more or less continuity from the volcano of Tongariro in the south through the lake country to Whakari the active crater in the Bay of Plenty in the east. Following the course of the Waiko river, we reached Tapuwaecharuru at the northern end of Lake Taupo. The bay on which this place is situated, and around which our journey began, is one of the most remarkable parts of the lake, for it is here that the Waikato river rolls out of the broad expanse of water to pursue its long winding course to the sea. At the point where the river leaves its great natural reservoir the depth of water is not more than from four to six feet, but a few feet beyond it gradually deepens as it flows onward in a rapid course through a winding narrow valley with sloping sides which gradually become higher and steeper until they form a precipitous terraced gorge as the stream cuts its way through the pumice formation of the tableland in a devious course to the Huka Falls, over which it plunges to dash onward again through a still deeper valley, the bed of which at the base of the falls is a little over 100 feet below the water-level of the lake—the distance between the lake and the falls by the course of the river being about five miles. The point where the river takes its rise is the only outlet of any kind around the vast margin of the lake, and it is this spot which forms, as a matter of fact, the true source of the Waikato. The great river which enters the lake at the south, and which is supposed by a romantic fiction of the natives to flow through the lake district without mingling with its waters, and which is erroneously styled the "Upper Waikato," is without doubt, when geographically considered, a distinct stream, which is no more connected with the Waikato proper than are the numerous other streams which all add their quota to the lake waters.

Eastern Shore of Lake Taupo.—From Tapuwaecharuru our course lay around the eastern shore of the lake, and as the weather was remarkably fine we obtained an uninterrupted view of the magnificent

scenery that unfolded itself before the gaze. Taking into consideration the grand expanse of lake, the varied forms of the surrounding mountains, with the active crater of Tongariro and the colossal proportions of Ruapehu—in fine, snow, water, mountain, and volcano—never had I gazed, in any part of the world, upon so varied and so beautiful a scene.

We passed along the shore until the western side of the lake opened out into a deep bay, with bold rugged cliffs shooting up perpendicularly from the water, and the moon was already high when we pitched our first camp on the banks of the Waitahanui river, with the broad lake on one side of our tent and a *raupo* swamp on the other.

At this camping-place, which stood on a level with the lake (1175 feet above the sea), we experienced for the first time one of those sudden changes of temperature which afterwards became a remarkable feature of the journey. At 4 P.M. the thermometer registered as high as 80° Fahr. in the shade, and at midnight it stood at 2° below freezing-point, being a variation of no less than 50° in eight hours; when we awoke at daylight the thermometer marked 4° below freezing-point. On the second day we likewise experienced a great variation from cold to heat and from heat to cold. Thus, on the 7th April at 6 A.M. the thermometer indicated 4° of frost, at 1 P.M. it registered 84° in the shade, at 3 P.M. it had fallen to 80°, and at 7.30 P.M. to 64°, giving an extreme variation of 56° in seven hours. At midnight we had 6° of frost.

Our journey of about 30 miles around the eastern shore of the lake brought us to the delta of the Upper Waikato, where that river flows into the lake. At this point the rapid stream flows into a semicircular bay formed by a bend in the lake shore. The river, owing to recent rains and the melting of the snows of Ruapehu, was coming down at a rapid rate; and the water, sweeping over our horses' backs, nearly carried them from under us. This is one of the most dangerous crossing-places around the lake at the time of a strong fresh, as the waters in their rapid descent from the highlands to the south carry everything in their course into the broad lake beyond.

At a short distance from this point we reached Tokanu, which is situated at the extreme south-western end of the lake and on the shores of a picturesque bay. Here, upon the sides of the fern-clad slopes and level flats, amidst boiling fountains, hot springs, and fumaroles, the *whares* of the natives were scattered about in the most picturesque confusion, but all looking out upon the lake and its picturesque surroundings. All the springs, solfataras, and fumaroles hereabout partake of the same character as those of the other centres of thermal action around the lake, and are used by the natives in the same way for the curative properties they possess, as well as for cooking, bathing, and other purposes. The largest and most remarkable geyser is Te Pirori, which from a deep round hole throws up a column of boiling water to a height of 10 to 15 feet amidst vast volumes of steam. The whole region of the Kaka-

ramea range to the rear of the settlement was without doubt at one time the seat of an extensive volcanic action, and it is from the still active agencies observable in certain parts of these mountains that the existence of the present springs may be traced.

The Rangipo Tableland.—From Tokanu we followed the course of the Upper Waikato, our direction being along the Rangipo tableland towards Tongariro, which was some 15 miles distant by the way we were going to attack it; and as we were acting a kind of strategic movement, we kept out to the east along the Waikato river to avoid being seen by the natives of Rotoaira, who keep watch and ward over the sacred mountain.

The Rangipo plateau—or place of the “black cloudy sky,” as its name implies—which may be said to form the central division of the great highland of the interior of the island, is in reality considerably higher than the extensive elevated region surrounding Lake Taupo. While the latter has a mean elevation of about 2000 feet above the level of the sea, the height of the Rangipo is over 3000 feet at its highest point on the Onctapu desert on the eastern side of Ruapehu. This extensive plane of elevation takes its rise a short distance from the southern end of the lake, and extends in the form of broad open downs for a distance of over 40 miles, when it merges into the Murimotu Plains as they fall to the south. On its eastern margin are the Kaimanawa Mountains, at the extreme base of which the Upper Waikato rises in its winding course to join the great lake beyond; to the north-west the cone-shaped summits of the Kakaramea range rise up, clothed with a dense vegetation as they slope gracefully to the shores of Lake Rotoaira in the west, and beyond which there are again extensive plains which slope gradually to the valley of the Whanganui. Right in the very centre of the tableland towers the magnificent cone of Tongariro, situated in the midst of a cluster of lower mountains; whilst close to it and separated only by a narrow valley stands the giant form of Ruapehu.

Up to the time when we arrived at the Rangipo we had enjoyed the most delightful weather, but a sudden change was the prelude to some of the hardest experiences of our journey. A great storm and flood set in, and during the ten days and nights which it lasted, the rain poured down incessantly without a single hour's intermission and without a single break in the clouds, the wind blowing a hurricane most of the time, and veering round to all points of the compass, but invariably coming back to north-east and north.

Ascent of Tongariro.—Before dealing with the particulars of the ascent of Tongariro, I will describe the general physical and geological features of the system of volcanic cones, comprising what I may term the Tongariro group.

The cluster of cones forms collectively an almost complete circle rising from a level plateau, which near the base of the mountains has a

general elevation of about 3000 feet above the level of the sea. Right in the very centre of this great circle of cones and extinct craters, the tapering form of the burning mountain rises from the bottom of an extensive basin-like depression, which, encircled as it is by the rugged sides of the surrounding ranges, has somewhat the appearance of an ancient crater. This beautiful mountain, especially when viewed from its southern side, strikes the beholder by its wonderfully symmetrical proportions. Besides the active crater at the summit of the great cone, there is another to the north-eastern side of the group, known as *Keledahi*, near to which there is likewise an extensive system of boiling springs.

The morning of the 18th April broke dull and cloudy. We had up to this time been detained exactly ten days through stress of weather, whilst waiting to ascend the *tapued* mountain,* the dull monotony of our position being only relieved by the somewhat exciting expectation that the Maoris might be down upon us at any moment. The thermometer which for the three previous days had given a mean average of 57° Fahr. in the shade, suddenly fell to 43°. The omen was a good one; a cold invigorating breeze blew direct from the south, the sun shone brilliantly, the dark cloud which had up to this time entirely obscured the mountain, rolled away, and the magnificent tapering cone glittering with ice and snow, and crowned with its cloud of steam, stood out against the sky in beautiful relief.

We gained the Waiho-honu valley, a wild ravine, with a winding stream running down its centre, and strewn with gigantic boulders of black shining rock, volcanic rock which appeared to have been rounded by the action of fire, and in some cases to have been partially melted before their ejection from the crater.

We reached the base of the great cone at its southern side, at a point which marked 4000 feet above the level of the sea. Just at this part of the cone some volcanic disturbance which had occurred probably ages ago, had poured down a stream of liquid lava, which, cooling as it were by some sudden blast, had congealed into a rugged and almost perpendicular ridge of dark lustrous adamantine-like rock, in its overflow from the summit of the mountain. It was up this precipitous ridge that we determined to fight our way.

Fortunately the weather kept beautifully clear, and at an altitude of 5000 feet we obtained a magnificent view of Mount Egmont, its peaked snow-clad summit rising like a glittering island above the vapoury cloud that hung around the lower portion of the mountain. At 6600 feet two small blue lakes were visible on the summit of a flat-

* Tongariro is strictly *tapu*; this word is applied to all places held sacred by the Maoris, it is synonymous with the *taboo* of the South Sea Islanders. To interfere with or trespass upon any place to which the *tapu* has been extended is considered an act of sacrilege.

topped spur, while about six miles distant to the south was the grand form of Ruapehu, its peaks rising in the form of glittering cones high into the clear air. At this point we found the last sign of vegetation in the small Alpine plant *Gnaphalium bellidioides*. At 7000 feet the whole aspect of the cone had a bare and desolate appearance, and was very treacherous and slippery with sheets of ice. Here we had to go on all-fours, and even in this way it was very difficult to prevent ourselves rolling down the precipitous slopes below. We could now smell the sulphurous fumes of the crater, as the clouds of steam rolled over us.

We crawled up a steep frozen incline on to the hot quaking edge of the great crater, where a grand and curious sight burst upon our view. We were now at an altitude of over 7000 feet above the level of the sea. The steep broken sides of the crater wound before us in the form of an almost complete circle, nearly a mile in circumference. Within the great circle there was a smaller or inner crater, the sides of which inclined gradually towards its centre in the shape of a complete funnel. This inner crater was separated from the larger one only by a narrow slip or ridge.

Looking down into the main crater which appeared to be about 400 feet in depth, its sides, rugged and broken as it were by the force of volcanic fires, were built up principally of enormous masses of trachytic rock, lava ridges, and beds of conglomerate, formed mostly of rounded stones and boulders, fused together into a compact mass by what must at some period have been a very powerful igneous action. At the bottom of the crater there were scattered about huge rocky ridges, from the large crevices and fissures of which jets of steam burst forth with a roaring screeching noise which echoed from the depths below with a wailing sound. Hot springs sent up streams of boiling water, which, running over the rocks and losing themselves in the hot soil, were sent high into the air again in the form of coiling jets of vapour. Miniature cones of dark, smoking mud rose up in every direction, while around all was a seething fused mass of almost molten soil. In every direction were large deposits of pure yellow sulphur, some of which assumed a rock-like formation. At other places it formed a crust over the steaming earth, and when the thermal action was less intense the glittering yellow crystals covered the ground like a thick frost. No fire was visible in the crater, nor was there any indication of a very recent volcanic eruption. The whole crater of the mountain was in the state of a very active solfatara, which is evidently more active at some periods than at others.

The inner or second crater, which likewise sent forth a vast volume of steam from its boiling depths, was in much the same condition of activity as the larger one, only that the deposits of sulphur literally lined its sloping sides with a bright yellow coating, which came up to the very summit of its rim, and lit up the steam clouds in brilliant prismatic hues.

It was dark when we reached the base of the mountain, but we managed by slow degrees to find our way over the masses of rock which lay scattered over the deep ravine forming the head of the Waihohonu valley. When we arrived at our camping-place our first anxiety was to see that the natives had not swept down and taken our horses. Luck was, however, on our side, and we found the animals where we had left them. It was evident that we were going to have a severe night, as the temperature was falling rapidly, and as the moon rose bright and clear, a heavy frost set in. We lit a fire and made a scanty meal off tea and biscuit, and as we were anxious to get clear of the *tapued* mountain with the first streak of dawn, we resolved not to erect our tent in order that we might not be delayed in our rapid retreat. We therefore spread our blankets upon the ground and made a tolerably comfortable bed on the scoria. At midnight the whole valley was covered with a thick coating of white frost, which glistened like snow beneath the pale moonlight. At this hour the thermometer stood at 27° ; at four o'clock A.M. it marked 22° , and at six o'clock, just before sunrise, it indicated exactly 12° of frost.

It did not take us long to saddle up, and once on our horses we rode rapidly away from Tongariro; and just as the first ray of sunlight gleamed over the hills, we gained the plains beyond to begin the ascent of Ruapehu.

Ascent of Ruapehu.—The level plain separating Tongariro from Ruapehu was not more than five miles across between the wide-spreading bases of the two mountains, and as we gradually approached towards the latter its gigantic proportions became every moment more distinctly visible. The aspect of the mountain as it rose in all its grandeur above the surrounding tableland, resplendent in ice, snow and sunshine, was most beautiful. Ruapehu is situated immediately in the centre of the great tableland which forms the most elevated portion of the North Island. The mountain which takes rank among the largest extinct craters in the world, assumes the form of an enormous truncated cone, with a far-reaching base of oblong form, and which gradually narrows towards the summit, at which point the mountain is nearly a mile in length from its northern to its southern peak. Its base, if calculated from where it springs from the level plains, may be estimated at about 60 miles in circumference. Ruapehu, unlike Tongariro, is not a true scoria cone, but a gigantic crater of elevation which during its volcanic outbursts sent forth showers of ashes and rivers of lava that spread themselves for miles around the base of the mountain, while the surrounding region over a vast area was upheaved by its elevatory force.

It did not take us long to see that it would be impossible to make the ascent and descent of the mountain in a single day. We therefore tethered our horses on a small patch of Alpine shrubs, where they remained with but scanty food and without water for thirty-six hours.

We next packed ourselves with the tent blankets and other necessities to the extent of about 25 lbs. each, and set off to climb the long dreary spurs which mounted steeply upward until they lost themselves in the snow-line where we resolved to camp for the night in order to begin the final ascent to the summit of the great peak at daylight on the morrow. Heavily laden as we were, we found the climbing both trying and monotonous. Our feet sank deeply into the shifting scoria which, fractured into small pieces, covered the sides of the mountain for miles around in a dark grey deposit devoid of all vegetation.

At an altitude of 6200 feet, evening closed around us, and we determined to make the dreary locality we had reached our camping-place for the night; and by the aid of the alpenstocks and flagstaff we had brought up with us, we managed to partially erect our tent under the lee of a boulder. Although the moon shone as bright as day, the wind still continued to blow in heavy gusts, and at midnight the climax came—a terrific gale of wind swept over the mountain, and in an instant our tent was carried away from over us. So great was the force of the wind, that it was impossible to stand against it. Blinding showers of sand and scoria filled the air almost to suffocation; everything was covered with a fine dust, which got into the hair, filled the eyes, and caused a choking sensation about the throat. It was useless to endeavour to erect our tent again, so we squatted down, Maori fashion, in our blankets, behind another boulder which served to break the force of the wind. The thermometer now stood at 27°, and the gale continued to blow throughout the night, sweeping over the ice-bound summit of the mountain and then down into the valleys below with extraordinary force. At five o'clock in the morning the thermometer indicated 7° of frost.

As soon as we had breakfasted we started to make the ascent of the great peak whose steep snow-clad sides rose up at the end of the spur on which we had been camped, the altitude of this spot being 6200 feet. At 7000 feet we gained an enormous lava bluff, which formed rugged giant-like steps of rock, up which we climbed with great difficulty. At 7400 we came to another bluff-like formation, which rose above a steep scoria ridge covered with small particles of trachytic rock, pumice, tufa, and obsidian. From an altitude of a little over 5000 feet we had found no vegetation, save that represented by the two small plants previously mentioned, *Ligusticum aromaticum* and the *Gnaphalium bellidioides*, which grew side by side at an altitude of 7000 feet under the sheltering rocks of a lava ridge facing the north. At an altitude of 8400 feet towered a series of jagged rocks, which form conspicuous features in the outline of the great mountain when viewed from the plains to the east and north. All round this region the mountain was clad with snow, and festoons of icicles glittered from every rock and precipice. At 9000 feet we came to a steep incline covered with frozen snow as hard as ice. Up to this we had to crawl on our hands and knees, as the wind, sweeping around the

mountain from the right, fearfully cold and with unabated force, made it impossible to stand. At an altitude of 9100 feet, after a hard struggle we gained the rounded top of the great peak. Even at this stage we were not at the summit of the mountain; for the enormous rocky crown which we had remarked from the plain below, still towered above our heads to a height of 150 feet. We now found that this singular monument was formed by a large outcrop of lava and conglomerate rock, which appeared at some remote period, when the volcanic fires were at their fiercest stage, to have oozed up above the surface of the surrounding rocks, and then congealed into a craggy mass with a symmetrical outline which assumed the form of a rounded bluff towards the east, and tapered gradually off towards the west, covered with a thick crown of frozen snow that overhung its summit like a fringe. To scale this ice-bound pinnacle was our next task. With the cold blasts coming now and again with the force of a perfect hurricane, we crawled on our hands and knees along the steep slopes of the lower end, and cut footsteps with our tomahawks in the snow and ice. In order to steady ourselves, we linked ourselves together by holding on to the flagpole, as in many places a single slip of the foot would have sent us rolling down the frozen steep slopes. Cutting away the enormous icicles that impeded our progress, we climbed step by step up the treacherous sides, but as we neared the top the gusts of wind swept round on every side, so as to render it impossible at some points to approach the edge.

On the summit, which stretched away for nearly a mile in length, a glorious sight burst upon the view. Peak rose above peak from the dazzling expanse of snow, each towering mass of rock, tinted of a reddish hue, standing out clearly defined against the light blue sky. Immediately beneath where we stood was a steep precipice which fell perpendicularly for hundreds of feet below, and beneath this again was an enormous circle of jagged rocks marking the outline of a gigantic crater filled to its brim with snow which was furrowed into chasms of great depth. The furthest southern peak of the mountain stood out in grand relief in the distance, its rounded cupola-shaped summit being perfect in outline, as if artificially fashioned to serve for the dome of a Mahomedan mosque.

When we had roughly mapped out, by the aid of some of the most prominent mountains, our intended northerly course through the King Country, we set to work and built a cairn of rock of pyramidal shape about four feet high, on which we erected a flag.

As we had now successfully accomplished the ascent of the two great mountains, I determined to leave the *tapued* district as soon as possible and strike a south-easterly course across the Onetapu desert to the southern base of the Kaimanawa Mountains, in order to examine the geological formation of that region.

The Onetapu Desert.—The Onetapu desert, or “desert of sacred

sand," as its name implies, forms one of the most curious features of this region. It stretches from the eastern slope of Ruapehu to the banks of the Upper Waikato river across the centre of the great tableland, and covers a large area of country. In summer it is parched and dried, and gives life only to a few stunted Alpine plants; and in the winter months, when the snows cover it, it is both difficult and dangerous to traverse. The desert at the surface is composed entirely of a deposit of scoria, with rounded stones and trachytic boulders above, while in some places rise enormous lava ridges. By its formations it would appear as if Ruapehu when in a state of activity had distributed its showers of ashes and lava over this wide region; and it would also appear that at the period at which this extensive deposition of scoria occurred, there must have been growing upon this very spot an extensive forest similar to that now found on the western side of the mountain; for as we rode over the dreary expanse we found the remains of enormous trees, which had been converted into charcoal as it were at the time when the fiery ashes swept over them, and which had since been exposed as the upper surface was denuded by the action of the water flowing down from the mountains.

The Kaimanawa Mountains.—The Kaimanawa Mountains are situated in almost the very centre of the island, with a general north-easterly and south-westerly bearing, and attain to an elevation of about 6000 feet above the level of the sea. Stretching across the great central tableland in an extent of about 80 miles, their tall serrated peaks form a grand and beautiful feature in the landscape, while the primeval forests which clothe them to their summits are among the finest in the country. It is, however, the geological formation of this extensive range, covering many hundreds of square miles, which is of special interest. Unlike the volcanic cones which form one of the most remarkable features over a large portion of this division of the country, and which belong to a more recent geological period, the rocks composing the Kaimanawa Mountains comprise the Lower Carboniferous and Upper Devonian systems.

We ascended these mountains to an altitude of over 4000 feet, and found quartz reefs *in situ*, with disintegrated quartz of a gold-bearing character on the slopes of the hills and abundant quantities in the creeks; and from these and other auriferous indications I noticed on all sides, I am firmly of opinion that this extensive range offers to the geologist and the miner a rich field for research. Natives of this district with whom we afterwards came in contact assured us of the existence of gold in these mountains, as likewise of a mineral which by the description they gave I judged to be silver.

Second Ascent of Ruapehu: Sources of the Whangaeahu and Waikato Rivers.—Having satisfied myself as to the geological formation of the Kaimanawa Mountains, I next determined to trace up the Whangaeahu and Waikato rivers to their sources in Ruapehu.

The Whangaehu river, which takes its rise in the eastern side of Ruapehu, is one of the largest streams in the Island. Bursting forth high up in the snows of the mountain, it crosses the desert in an easterly direction, and then takes a swift bend towards the south in its course to the coast, where it joins the sea at a distance of about 60 miles from its source. From the point where it issues from the mountain and for many miles as it winds through the plains, its waters are rendered perfectly white by the enormous amount of alum with which they are charged. We had been informed by the natives at Tokanu that the source of the river lay in an enormous black rock or dark bluff which forms a conspicuous feature near the eastern base of the mountain, and it was therefore towards this point we directed our course. It was, however, soon made clear that the true source of the river was a long distance up the mountain from this point. The dark rocks, which were nothing more than enormous outcrops of lava resembling solid walls of bronze, 200 feet in height, formed the portals or entrance to a deep rugged gorge that wound steeply to the snow-line of the mountain.

At 5300 feet this ravine opened out on our left, and over a flat terrace above a large waterfall fell from a height of 150 feet of a semicircular precipice into a deep rocky basin. We named this "the Horseshoe Fall," from the shape of the precipice over which it fell. From this point we mounted still higher; on our right was a sheer precipice of 400 feet and on our left rolled the Whangaehu at a depth of about 300 feet in the gorge below. At 6200 feet another waterfall, far larger and more beautiful than the one we had previously discovered, burst into view. Here the white waters of the Whangaehu rolled swiftly from the snows above, until the whole volume concentrated into a narrow rocky channel burst over a precipice with a fall of 300 feet into the rocky gorge below. All around, the craggy rocks and icicles were white with a deposit of alum from the spray of the fall; while the water, of a milky hue, poured over the precipice in a continuous frothy stream, which appeared by its whiteness like folds of delicate lace. We named this the "Bridal Veil Fall," on account of its peculiar lace-like appearance. At 6700 feet we discovered two cascades falling over a steep bluff-like precipice, and only at a short distance apart from each other. At an altitude of 7000 feet there was only just room enough to crawl along between the wall of rock on one side and a precipice of 200 feet on the other which fell with a sheer descent into a big circular ice-bound pool into which the milky waters of the river poured in the form of foaming cascades. Here around on every side rose lofty precipices, and buttresses of black lava in the form of stupendous bluffs, supporting, as it were, the rampart-like height above, while right in front of us and towering to an altitude of over 1000 feet, was a glacier slope crowned with craggy peaks which stood out in bold relief against the sky. This rugged

locality was one of the most singular of the whole mountain. The gorge wound here in such a way that none of the surrounding country could be seen, and there was nothing but the blue heavens above to relieve the frigid glare of the ice, the cold glitter of the snows, and the dreary tints of the frowning fire-scorched rocks. Right under the snowy glacier above us were wide yawning apertures, arched at the top, and framed as it were with ice in the form of rude portals, through which the waters of the river burst in a continuous stream. We entered the largest of these singular structures, and found ourselves in a cave of some 200 feet in circumference, whose sides of black volcanic rock were sheeted with ice and festooned with icicles. At the further end was a wide cavernous opening, so dark that the waters of the river, as they burst out of it in a foaming, eddying stream down the centre of the cave, looked doubly white in comparison with the black void out of which they came. The roof of the cave was formed of a mass of frozen snow, fashioned into oval-shaped depressions, all of one uniform size, and so beautifully and mathematically precise in outline as to resemble the quaint designs of a Moorish temple; while from the central points to which the edges of these singular designs converged, a long single icicle hung down several inches in diameter at its base, perfectly round, smooth, and as clear as crystal, tapering off towards its end with a point as sharp as a needle. We had brought candles with us and we managed with some difficulty to cross the stream to explore the deep cavern beyond, but to do so we had to climb over sharp slippery rocks, which were covered with a coating of ice, as if they had been glazed with glass. We managed with considerable difficulty to get into the second cave, and to penetrate into the centre as it were of the great mountain, but just as we were winding along a kind of subterranean passage through which the river burst, our lights went out owing to water falling from above, and as we could hear nothing but rushing waters ahead, we with great difficulty beat a retreat into the first cave. Wherever the water poured over the rocks it left a white deposit, and when we tasted it it produced a marked astringent feeling upon the tongue, leaving a strong taste of alum, sulphur, and iron, with all of which ingredients, especially the two former, it appeared to be strongly impregnated.

It is an interesting geographical fact that the waters which form the source of the Upper Waikato river burst from the sides of Ruapehu within a short distance of the Whangaehu, and at almost the same altitude. Both streams run almost parallel to each other for a long distance from the source, and then as they reach the desert they gradually diverge and divide the two great watersheds of this portion of the country, the Waikato flowing to the north into Lake Taupo, and the Whangaehu to join the sea in the south.

We followed the course of the Whangaehu river through open

country for about 40 miles in a south-easterly direction, and then travelled westerly across the Murimota Plains, a fine open tract of grassed country forming the southern slope of the great central table-land. From this point I determined to penetrate as far west as the valley of the Whanganui river at its junction with the Manganui a-te-Ao and reach the plains to the north of Ruapehu and Tongariro by the valley of the latter river.

The Te Rangikaika Forest.—Once across the Murimotu Plains we entered the Te Rangikaika Forest, which, rising almost to the snow-line on the western side of Ruapehu, stretches in an unbroken course to the west coast, and covers an approximate area of some 3000 square miles. This is, without doubt, so far as the size and variety of its vegetation is concerned, the finest forest in New Zealand. When we had got well on our way we found this enormous wilderness spreading itself over a perfect network of broken rugged ranges. The soil was everywhere of the richest description, and many of the colossal trees averaged from 30 to 40 feet in circumference at the base, and towered above us to a height considerably over 100 feet. We found travelling through this wilderness of vegetation both fatiguing and difficult; there was not 100 yards of level ground, and our course lay over steep precipitous hills from 200 to 400 feet in height, which we were constantly ascending and descending. Our first day's journey brought us to two small lakes named by the natives Rangitanaiti and Rangitauanui. This spot seemed to be the home of many of the beautiful native birds of the island.

The Manganui a-te-Ao.—A journey of four days' incessant travelling through the forest brought us to Ruakaka, an extensive native settlement situated in the valley of the Manganui a-te-Ao, which was here sunk like a pit in the heart of the mountainous forest region. Here we found the Maoris living in the same primitive way as in the time of Cook. When we questioned them as to their religious principles they told us "that they believed in nothing, and got fat on pork and potatoes."

I found the altitude of Ruakaka was 800 feet above the level of the sea, and it is worthy of remark, as showing the rapid fall of the country in this direction, that in order to reach this place from the great central table-land where we had at first entered the forest we had descended by the circuitous way we had come 1600 feet in about 40 miles.

These figures will give some idea of the swift current of the Manganui a-te-Ao, which, taking its rise near the north-western side of Ruapehu, cuts its way through a mountainous country in a deep, rock-bound channel, and receives the waters of innumerable tributaries along its entire course. The volume of water poured down by this impetuous stream is something prodigious, while, I believe, the rapidity of its current is unequalled by any other river in New Zealand. We

found that the river was known to the natives by three names, viz. Manganui a-te-Ao, or "great river of light"; Te Waitahupara, and Te Wairoahakamanamana-a-Rongowaitahanui, or "the river of ever-dancing waters and steep echoing cliffs"; while the Whanganui, into which it fell, was likewise known as Te Wainui-a-Tarawera, "the great waters of Tarawera." The two rivers form the principal means of communication for the natives of Ruahaka, with the outer world, as by this means they travel by canoes to the coast. They are expert canoe-men, and shoot the rapids of both rivers with wonderful dexterity.

From Ruahaka our course lay easterly up the valley of the Manganui a-te-Ao, and for 30 miles through another portion of the dense forest. We had to cross the river ten times at different points in its winding course. Although we could only lead our horses through the forest, it was necessary to ride them whenever we came to the crossing places, as at these points the water was in most places over their backs, and often nearly over their heads when they got into the big holes that everywhere dotted the rugged channel of the river. All along the course of the Manganui a-te-Ao, the scenery was of the wildest description, the steep cliffs and mountains towering above us in the grandest confusion.

After crossing the stream for the ninth time in a two days' journey, we climbed a steep ascent and gained the broad open tableland at an altitude of 2850 feet. Thus to arrive at this elevation from Ruahaka, we had travelled over hills and mountains the whole way, and yet in a distance of about thirty miles the country had risen 2000 feet from our point of departure, which stood at an altitude of 800 feet.*

Now that we had done eighty miles of forest travelling since we had left the Murimotu Plains, it is impossible to describe with what delight we hailed the grand open country before us, as a pleasant change from the endless vegetation we had passed through and which had literally rained with moisture.

The fine grassy expanse covered with a thick coating of white frost we had now entered, we afterwards found was known to the natives as Waimarino, from the name of the river running through it, which had its source in Haurangatahi, a large densely wooded mountain visible in the distance to our right. We now viewed Tongariro and Ruapehu from the north-west, an aspect from which we had not beheld them before, while the snow since last we had beheld it had crept down to their base, and mingling with the green of the vegetation, produced the most beautiful effect as the mist of morning rolled away beneath the glowing power of the sun.

We journeyed on for about fifteen miles to Ngatokorua, a Maori pah, where we were hospitably entertained for three days by Pehi Hetau Turoa,

* The rapid rise of the valley of this river may be seen by reference to the altitudes of the various crossing places as given on the table attached to the map.

one of the principal chiefs of the Whanganui tribes; from this place we took an easterly curve across the open plains in the direction of Tongariro, with a view of tracing up the source of the Whanganui river, which we had learned from the natives rose somewhere in the northern side of the volcano, and after that I had determined to examine the Tongariro springs and the crater of Ketetahi, which were situated a short distance further to the east on the same mountain.

Source of the Whanganui.—On one of the principal spurs to the north of Tongariro, we found the source of the Whanganui, in a narrow rocky gorge at an altitude of 3700 feet above the level of the sea, the water evidently arising from mountain springs, and at certain times from the melting of the snows. The river from this point runs rapidly down the winding gorges of the mountain, and after receiving in its course the waters of numerous other streams, winds across the Okahakura Plains, and afterwards enters the dense forest of the Tuhua, and then taking a bold sweep to the north-west receives the waters of the Ougaruhe and numerous other streams as it flows in its long course to join the sea in the south. The Whanganui, which, after the Waikato, forms the most important river of the North Island, receives the whole of the western watershed of the great central tableland, besides that of other divisions of the country.

Hot Springs of Tongariro.—Leaving the source of the Whanganui, we took an easterly direction up one of the northern mountain spurs of Tongariro, and at an altitude of 4900 feet we found the hot springs roaring beneath us. We got with some difficulty down the rugged sides of a chasm, when we stood in the centre of a region where boiling springs burst from the earth, where jets of steam shrieked from innumerable fissures, where enormous boiling mudholes bubbled like heated cauldrons, and where the hot steaming soil, covered in every direction with yellow crystals of sulphur and glistening siliceous deposits, quaked beneath our feet, clouds of steam wound overhead, and in many places fountains of hot water shot high into the air. Some of the warm springs were of a dark coffee colour, caused apparently by the admixture of iron; others were yellow with excess of sulphur; others white with alum; while not a few were of the purest blue. These springs, as the Maoris afterwards informed us, possess wonderful curative properties in all cases of chronic rheumatism and cutaneous disorders, and many natives suffering from ailments of that kind come long distances to avail themselves of the thermal waters. This portion of Tongariro, like all other parts of the mountains, is strictly *tapu* to Europeans.

A short distance beyond the springs and near to the end of the great spur, we found the small crater known to the natives as Ketetahi, formed by a circular aperture emitting vast volumes of steam.

Western Taupo.—Leaving the Tongariro Mountains, we took a

northerly course along the Te Pakaru plain, a fine open tract of country between the Kakaramea ranges and the Tuhua forest. We next reached the western watershed of Lake Taupo, the first stream flowing in that direction being the Koromanga. I determined to take this direction in order to explore the great tableland of Western Taupo, and thence penetrate to Alexandra by the country to the northward of the great central mountain chain ending in Titiraupenga.

The western tableland of Lake Taupo has an average altitude of 1700 to 2200 feet above the level of the sea; it stretches along the entire western shore of the lake, and inland to the Haurungaroa and Hurakia Mountains, which extend in a northerly direction as far as Mount Titiraupenga, and form the eastern boundary of the mountainous central portion of the King Country. These two mountain chains attain to an altitude of 2300 to 2500 feet above the level of the sea, the eastern slopes forming the principal source of the watershed of the western division of the lake; while the inland waters with those of other mountains of the same system are received mostly by the Orgaruhe river, one of the principal tributaries of the Whanganui. The whole of these ranges, which present a very broken appearance, are densely covered with luxuriant forests. The country from the eastern slopes stretches in a series of open plains to the lake, the western coast of which is bounded by steep rugged cliffs, which assume in many places the form of bold headlands, the highest of which, Mount Karangahape, attains to an altitude of about 2000 feet.

The Northern Tableland.—Having traversed the western tableland, we reached the head-waters of the Waihora river, which was the last stream of any importance forming the western watershed of Lake Taupo. Taking now a north-westerly course, we crossed the Te Tihoi plains, a fine tract of open country extending around the Mountains of Titiraupenga as far north as the banks of the Waikato, into which the drainage of this portion of the country fell by means of many fine streams, the largest of which were the Waikino, Waipapa, Waipari, and Upper Punui. Here the tableland began to fall perceptibly towards the north-west, and for a long distance it averaged in altitude from 1000 to 1150 feet.

Valley of the Waipa.—Once across the Te Toto Mountains, we soon gained the broad open valley of the Waipa. This river, which forms the principal tributary of the Waikato, has its source on the southern side of the Rangitoto Mountains. The principal tributaries are the Mangapu, Manga-o-Rewa, and Mangawhero, with the Punui as the chief. Beyond the head of the river the watershed falls towards the Mokau river, south of which the country is open for a considerable distance in the direction of the Te Taraka plains, until the great central belt of forest country is reached. The whole valley of the Waipa lies very low, its altitude near the margin of that stream being scarcely 100 feet above the level of

the sea. Travelling along this valley, we reached the King's settlement at Whatiwhatihoe and crossed the *aukati* line forming the northern boundary of the King Country on the night of the 18th of May, 1883.

Previous to reading of the paper,

The PRESIDENT said that Mr. Kerry-Nicholls was not a colonist but a traveller whom a laudable curiosity had led to Australia, and then on to New Zealand, where he spent eighteen months. He had a great deal to say about a region which was almost, if not entirely, new to the members of the Society. No doubt many now present heard the interesting paper which was read by the Rev. Mr. Green last year on the Alps of the Southern Island of New Zealand. Mr. Kerry-Nicholls would not be able to give a description of the same tremendous glaciers or lofty mountains, but he would describe a district quite as interesting and as curious, different from that explored by Mr. Green, and still more different from ordinary European countries. The part of New Zealand in which Mr. Kerry-Nicholls had travelled was inhabited by the Maoris to the entire exclusion of all European settlers. He must not be understood to say that all the Maoris were collected in that district; but whilst they were distributed over considerable portions of the island, the particular part to be described in the paper—on the west of the island, was inhabited exclusively by the Maoris. After a good deal of experience of the white man, the Maoris had come to the conclusion that if they desired to maintain any portion of their country which they could call their own and inhabit in the fashion of their ancestors, they must keep out the invading white man, and he thought that no one would be prepared to say that they were wrong in that view; for the natural instinct of the white man was to spread everywhere, and wherever the white man and the coloured man came into collision, it was generally but a very short time before the coloured man disappeared. The region was full of great interest, and was inhabited by a people admitted to be among the finest of the so-called savage races in the world.

On the conclusion of the paper,

The PRESIDENT in proposing a vote of thanks to Mr. Kerry-Nicholls, said that the meeting was no doubt satisfied that his opening expressions as to the novelty, strangeness, and peculiarities of the country had been fully justified. They had been carried by the lecturer into a region of extraordinary beauty and interest, and he hoped that Englishmen would not be tempted to take possession of the districts which had been retained by the native inhabitants, who seemed to be very good neighbours. He trusted that good faith would be kept with the people in spite of the temptations to possess such a beautiful region.

The Free State of the Congo. By E. DELMAR MORGAN, F.R.G.S.

Map, p. 272.

ON the 12th of September, 1876, a movement was initiated by the King of the Belgians which has resulted in important events for Africa and great changes in the relations of European powers to the Equatorial regions of the continent. At the King's invitation, representative geographers and friends of Africa, of six European nations (besides Belgium), met at a Conference in the Royal Palace at Brussels, to discuss the question of the exploration and the civilisation of Africa and the means of opening up the interior of the continent to the commerce, industry, and scientific

enterprise of the civilised world, and more particularly to consider what measures should be adopted to extinguish the terrible scourge of slavery, which, though almost stopped on the coasts, was known to continue its desolating influence over wide and populous tracts in the interior of that continent. Among English geographers who took part in these deliberations were the late Sir Bartle Frere, Sir Henry Rawlinson, Sir Rutherford Alcock, Colonel Grant, and Lieutenant Cameron.*

In his opening address the King said that the subject which united them was well worthy to rank among those which occupied the friends of humanity, and that the neutral territory of Belgium appeared to him to offer peculiar facilities for initiating an international movement such as they had in view. The Conference lasted three days, and before separating the assembly passed certain resolutions and declarations setting forth the objects and defining the limits of the work to be done.

Such was the origin of the International African Association, the progress of whose work has been from time to time recorded in our pages. In pursuance of its programme National Committees were to be formed in each of the countries represented, to collect funds for the purpose of co-operating in the despatch of exploring expeditions and the founding of stations, as centres of civilising influence in the interior of the continent.

But international co-operation was of short duration. In England, after very careful discussion in the Council of the Royal Geographical Society, it was decided that African exploration would be more effectually prosecuted by England, and the necessary funds more readily obtained, through separate national enterprise than by international association. Instead of the direct co-operation invited by the King of the Belgians, the "African Exploration Fund" was established, in March 1877; and with the public subscriptions obtained the expedition of Mr. Keith Johnston and his successor Mr. Joseph Thomson was despatched to explore the direct route to Lakes Nyassa and Tanganyika.

Nor was the international character of the movement long maintained in other countries where committees were established; in fact, the

* The following is a list of the members of the Conference taken chiefly from notes kindly supplied to us by Colonel J. A. Grant. For *Austria-Hungary*: Baron de Hofmann; Comte Edward Zichy; Fer. von Hochstetter; Lieutenant Lux. For *Belgium*: Baron Lambertmont; M. Banning; M. Emile de Borchgrave; M. Couvreur; M. le Comte Gobler d'Alviella; M. James; M. de Laveleye; M. Quairier; M. Sainetelette; M. Smalderl; M. Van Biervliet; M. Leon Vander Bossche; M. Jean Van Volxem. For *England*: Sir Bartle Frere; Sir Rutherford Alcock; Admiral Sir Leopold Heath; Major-General Sir Henry Rawlinson; Colonel J. A. Grant; Commander Cameron; W. Mackinnon, Esq.; Sir Fowell Buxton, Bart.; Sir John Kennaway, Bart., M.P. For *France*: Admiral le Baron de la Roncière de Noury; M. Henri Duveyrier; The Marquis de Compiègne; M. D'Abbadie; M. Maunoir. For *Germany*: Baron von Richthofen; Dr. Nachtigal; Dr. Schweinfurth; Herr Gerhard Rohlfs. For *Italy*: The Chevalier Cristoforo Negri. For *Russia*: M. Semenof. Sir Harry Verney, Bart., M.P., was living in Brussels during the sitting of the Conference, and took some part in it. Those named for England, France, Austria, and Germany, resided in the King's Palace.

movement, as we all know, degenerated rapidly into selfish national annexation of territory. The objects which had been set forth at the Brussels Conference could never have been attained had it not been for the persevering and generous efforts of the King of the Belgians, and the liberal expenditure of his private means. The Central Committee at Brussels, over which he presided,* sent out in the course of eight years no fewer than seven large expeditions from the East Coast towards Lake Tanganyika, the first and most important station being that of Karéma on its eastern shore.

Stanley's discovery of the Congo as a great highway into the interior happening about this time, gave a new impulse and direction to the work. Attention was now directed to the Western Coast. The King established a preliminary committee of inquiry called the "*Comité d'études du Haut-Congo*," under which Stanley was engaged and sent out on the mission which has led to such important consequences. The results of this first expedition encouraged the Brussels committee to enlarge its design. The *Comité d'Études* was expanded into the "*Association Internationale du Congo*," with the ultimate aim of establishing a Free State of the Congo.

In 1883, owing to the development of the undertaking, it was decided to establish the Association on a firmer footing by obtaining from the Powers the recognition of its sovereign rights acquired by treaties from the native chiefs of the Congo and Niadi-Kwilu region. As a preliminary step it was necessary to define the rights thus acquired. This was discussed and decided according to international law and precedent, by the late Professor Arntz, of the University of Brussels, Sir Travers Twiss, and other eminent jurists. Among parallel cases cited were the British North Borneo Company, and Liberia. Negotiations were opened with the United States of America through Mr. Sanford, formerly U.S. Minister at Brussels, who, after retiring from the diplomatic service, had become a member of the Association. Early in 1884 he took his departure for New York, where his overtures were most favourably received. The American press, especially the *New York Herald*, published important articles on the work of the Association. The President, in his annual message, made a declaration of an exceedingly friendly character, and the proposed recognition by the United States of the sovereignty of the Association was finally submitted to the Senate.

The following extracts from Senator Morgan's report from the Committee on Foreign Relations may be found interesting :—

"The President in his annual message to this Congress, expresses the sentiment of the people of the United States on the subject of our future relations with the valley of the Congo, in Africa.

* The Members of the Committee were as follow :—*President*, the King of the Belgians; *Members*, Dr. Nachtigal (Germany), Mr. Sanford (United States), M. de Quatrefages (France); *General Secretary*, Colonel Strauch; *Treasurer*, M. Galezot.

"Our attitude towards that country is exceptional, and our interest in its people is greatly enhanced by the fact that more than one-tenth of our population is descended from the negro races in Africa.

"The people of the United States, with but little assistance from the Government, have established a free republic in Liberia, with a constitution modelled after our own, and under the control of the negro race. Its area is 14,300 square miles; its population is about 1,200,000 souls; its commerce is valuable; its government is successful, and its people are prosperous.

"The necessity for a negro colony in Liberia was suggested by the fact that slaves found in vessels captured for violations of the slave-trade laws and treaties were required to be returned to Africa when that was practicable, and it was impossible, and it would have been useless and cruel, to send them back to the localities where they were first enslaved. Humanity prompted certain private citizens of the United States to organise the American Colonisation Society in aid of the return of captured slaves to Africa, and to find a congenial asylum and home for negroes who were emancipated in the United States. Henry Clay was, for many years, President of this Association, and assisted it with the influence of his great name and broad philanthropy.

"The success of the Liberian colony has demonstrated the usefulness of that system of dealing with a social question which is, to the people of the United States, of the highest importance. It has also established a recognised precedent in favour of the right of untitled individuals to found States in the interests of civilisation in barbarous countries, through the consent of the local authorities, and it has given confidence to those who look to the justice of the nations for a restoration of the emancipated Africans to their own country, if they choose to return to it.

"This great duty has, so far, been left entirely to the efforts of citizens of the United States, and it has been supported almost exclusively by their personal contributions. The governments of the world have been slow even to recognise the State thus founded by the courage and means of private citizens, but it is now firmly established in the family of nations, and is everywhere recognised as a free and independent nation.

"This pleasing history of progress, attended with peace and prosperity in Liberia, has given rise to a feeling of earnest interest amongst the people of the United States in the questions which arise from the recent discovery by their countryman, H. M. Stanley, of the great river which drains Equatorial Africa. They rejoice in the revelation that this natural highway affords navigation for steamers extending more than half the distance across the continent, and opens to civilisation the valley of the Congo, with its 900,000 square miles of fertile territory, and its 50,000,000 of people, who are soon to become most useful factors in the increase of the productions of the earth and in swelling the volume of commerce."

"The movements of the International African Association which, with a statement of its purposes, are referred to in the letter of the Secretary of State, appended to this report, are in the direction of the civilisation of the negro population of Africa by opening up their country to free commercial relations with foreign countries. As a necessary incident of this praiseworthy work, which is intended, in the broadest sense, for the equal advantage of all foreign nations seeking trade and commerce in the Congo country, the African International Association has acquired, by purchase from the native chiefs, the right of occupancy of several places for their stations and depôts. The property so acquired is claimed only for the Association, which is composed of persons from various countries, and it could not, therefore, be placed under the shelter of any single foreign flag.

"The African International Association established its stations, and opened

roads leading from one to another around the falls of the Congo in the same way that the older factories had been established, with the additional fact in their favour that their settlements were always preceded by an open agreement with the local government in the form of a treaty. A flag was as necessary for the purposes of their settlement, and as an indication of their right, and to designate the places under their control, as it was to the slave traders, whose only advantage is that they have been in possession a long time for the purposes of nefarious traffic in slaves, while the Association has been in possession only a short time for the benign purposes of introducing civilisation into that country.

"Having no foreign flag that they could justly claim, they adopted a flag and displayed it—a golden star in a field of blue—the symbol of hope to a strong but ignorant people, and of prosperity through peace. The native people instinctively regarded that as the first banner they had seen that promised them goodwill and security, and they readily yielded to it their confidence.

"The golden star of the banner of the International Association represents hospitality to the people and commerce of all nations in the Free States of the Congo; civilisation, order, peace, and security to the persons and property of those who visit the Congo country, as well as to its inhabitants; and if, in the promotion of these good purposes, it lawfully represents powers ceded or delegated to the Association by the local governments necessary to make them effectual, it does not thereby offend against humanity, nor unlawfully usurp authority in derogation of the rights of any nation upon the earth."

The discussion in the Senate lasted several days, resulting in a vote favourable to the Association; the President was authorised to recognise its flag as that of a friendly Government, and declarations were shortly afterwards exchanged between the Government of the United States and the Agent of the Association. About the same time a convention was made with France, which was a virtual recognition by that Power of its sovereign rights.

Soon afterwards a Conference on West African affairs was convened at Berlin, the scope of its deliberations comprising freedom of commerce in the basin of the Congo, free navigation on the Congo and Niger rivers, and the establishment of regulations for future acquisitions of territory in Africa.

It would be impossible to enter fully into the several provisions of the *Acte Générale* passed by this Conference; it will suffice to give briefly their general import with their bearing on political geography, referring the reader to the accompanying map.

The principle of Free Commerce in its widest sense was established in the immense basin of the Congo, a maritime belt of 360 miles along the Atlantic was placed on the same footing, and its future extension to the East Coast made probable on a still vaster scale. In this immense territory no import duties will be levied for twenty years to come, nor will such dues ever be exacted in the possessions of the International Association, which constitute by far the largest part. Natives and white men are placed on the same footing, and have similar rights guaranteed to them. All religions are tolerated, whilst the protection of the natives and the

proscription of the slave-trade are to be the fundamental principles of public law in the States and Colonies of Central Africa.

It was further enacted that special measures are to be adopted both by land and sea against the slave-trade, which continues to be the great scourge of Central Africa, and one of the principal obstacles to civilisation.

It was provided that States constituted in the basin of the Congo, and Powers founding colonies there, will have the right of neutralising their possessions either perpetually or temporarily.

One of the dispositions adopted by the Conference tends to prevent European wars from extending to Africa, and in the event of disagreements arising in Africa itself between the Powers of the basin of the Congo, recourse will be had to mediation, if not arbitration.

The free navigation of the Congo and its affluents was proclaimed, comprising an extent of about 5000 kiloms. (3106 miles) open to flags of all nations, and what applies to the river will, according to a somewhat original idea, apply also to railway, canal, or road, supplying the place of any obstructed part of the river. The transit dues must only be such as will compensate the cost of works executed in the bed of the river or commercial establishments erected on its banks.

An International Commission, to which each of the contracting Powers has the right to appoint a delegate, is specially charged to see that all nations benefit on an equal footing from the freedom of navigation and transit. It will at the same time have to provide, in concert with the riverine powers, for the improvement or maintenance of the *régime fluviale*, the security of navigators, and the carrying out of necessary improvements.

All works and establishments are neutralised in time of war, and lastly, the Act passed declares that the navigation of the Congo shall remain open in time of war for ships of all nations, both belligerent as well as neutral, and that private property will be respected, even though under an enemy's flag, on all the waters governed by the Act.

These dispositions constitute a remarkable progress in international law, and confirm those principles adopted by Belgium, and to which she owes the emancipation of her principal river. They moreover embody the spirit of all the treaties concluded by the Association, and set forth the objects it has pursued.

While the Conference was sitting at Berlin the Association concluded treaties with England, Denmark, Italy, Austria, Holland, Belgium, Russia, Spain, and the United Kingdom of Sweden and Norway; whereby all these Powers agreed to recognise its flag as that of a friendly State, the Association engaging on its side to accord to the subjects of these Powers full rights.

A further important negotiation was concluded, during the meeting of the Conference, in reference to the territorial limits of the new Free

State and those of the French and Portuguese possessions in the same region—much disputed matters, which were not settled until after long and interrupted negotiation. A final arrangement was, however, happily arrived at, and a treaty was signed at Paris, and on the 14th February an analogous one was concluded with Portugal.

By these treaties the question of the ancient claims of Portugal to the mouths of the Congo was definitely decided. Had not it been thus disposed of, serious complications might have arisen in the future, and the whole work of the Association been marred. Instead of this a definite agreement, sanctioned by all the Powers, has been made, and a new region opened to the commerce and industry of the civilised world.

The frontiers of the three Powers will be best studied on the map illustrating the present paper; but I may mention that by the convention with Portugal this Power gets the south or left bank of the Congo, from its mouth to Nokki, a distance of 90 miles, where there is a Portuguese and a French factory, the Association retaining the right bank with 23 miles of coast extending from Banana to a point south of Kabinda Bay. Here Portuguese territory again begins, so as to inclose the district round Kabinda, Molembó, Landana, and Massabé where the Association has long been established. This Portuguese *enclave*, as it is called, extends inland for 30 or 40 miles, as far east as the Lucullu, a left tributary of the Chiloango. From Nokki the Portuguese frontier runs east to the Kwango, a left tributary of the Congo, and then turns south. By the convention with France the Association yields up to this Power the whole of the valley of the Kwilu, called on its upper reaches the Niadi, where it was in possession of large tracts of country, and had established no less than eighteen stations. In exchange for this concession it retains the left bank of Stanley Pool which France had claimed through an act of annexation of De Brazza's lieutenant, Serjeant Malamine. Above Manyanga and up the Congo to a point beyond the river Likona, this river forms the boundary between African France and the Free State. Beyond this again the territory of the latter widens considerably, comprising a wide unexplored belt on either side of the river to Lakes Tanganyika and Bangweolo.

We have endeavoured to show the origin of the International Association, and have briefly traced the events which led to the formation of the Free State of the Congo; let us say a few words on the present position of its affairs and its immediate prospects.

The constitution of the New African State is not before us. Its administration will, no doubt, be guided by the same wisdom and foresight as have directed the work of the International Association. But some preliminary difficulties have to be met. Hitherto the porters employed on the Congo have mostly been men from the East Coast, natives of Zanzibar and its district, a lighter coloured race, probably owing to infusion of Arab blood, than the negro of Central Africa.

These Zanzibaris have been of great use as intermediaries between the Europeans and the natives, whose language, a dialect of the Bantu, sufficiently resembles the Swahili to allow of their understanding one another. Being farther advanced in civilisation and Mohammedans by religion, they have held themselves above the natives, for whose fetishism they have a contempt. These men, whose term of service is now expired or in course of expiration, prefer returning to Zanzibar rather than remaining on the Congo, and it is reported no more will be engaged. In future the Association must depend entirely on native porters to supply their places. Of these some 1200 were, by last accounts, carrying loads to Stanley Pool, of whom from 500 to 600 were transporting the steamer *Stanley* to the Pool. A regular supply of native porters under present conditions is of great moment, as until a railway is made, communication between Vivi and Isanghila, and between Manyanga and Leopoldville, must be kept open by them. Another trouble is the necessity of providing an armed force to protect the stations in the event of attack, and give a semblance, if not a reality, of strength to the establishment. The experiment of recruiting Houssas from the Niger districts has been tried, and failed. These blacks have warlike instincts and a soldierly bearing. They are organised into a police force at Lagos, and took part as auxiliaries in the Ashanti campaign. On the Congo, however, they have not been a success, and appear to have been troublesome and shown insubordination. In future, therefore, they will no longer be employed, but it will be difficult to find efficient substitutes. A local militia might be organised, but that would take time, and it is doubtful whether natives can be trusted at present with rifles, and how far they may be relied upon in an emergency.

It is pleasant to turn from these clouds in the Congo Free State and record its triumphs. From the last number of the 'Mouvement Géographique' published at Brussels, we learn that Mr. Tisdell, United States representative, has arrived at Vivi, and was proceeding thence to Stanley Pool. His Government was the first to recognise the sovereignty of the Free State, and they have also been the first to accredit their representative to it. It is also reported that the *Stanley*, the new stern-wheel steamer for the navigation of the Upper Congo, was approaching her destination, whither she is being transported in sections, and by this time she will probably have arrived at Leopoldville. The *Stanley* will make the sixth steamer launched on the Upper Congo, the other five being the *En Avant*, *Association Internationale*, *Royal*, and *Eclairer* belonging to the Association, and the *Peace* belonging to the Baptist Mission.

The Kara-kum, or Desert of Turkomania.

By M. PAUL LESSAR.*

THE region bounded by the Ust Urt, Khiva, Bokhara, Afghan Turkistan, Attok, and Akhal bears the general name of Kara-kum, though it is far from sandy throughout, and a considerable part consists of *kyrs*, *takirs*, and *shors*, to be described further on.

Aspects of the Country.—The Kara-kum sands, represented on maps by one conventional sign, are in reality very varied. They are divisible into three principal kinds. In the first kind the soil is clayey, largely mixed with sand; its surface is formed into hillocks, rarely more than seven feet high, and usually thickly overgrown with brushwood. In this kind of desert there is no difficulty in travelling, whether on horseback or in carts, in good or bad weather. To this kind belong all the sands between Merv and Attok, as well as those between Sarakhs and Chacha.

The second kind consists of real sands, not, however of a drifting nature, but everywhere knit together by bushes 10 to 15 feet high. It is only at the summits of the hillocks, which are higher than those of the first kind, that there is a little drift-sand, which is carried from place to place. Now and then, too, it may be met with along the road in ridges 70 to 100 feet wide, rarely more. Generally there are no high elevations in the Kara-kum wilderness, and the levels differ only 140 feet, rarely as much as 200 feet between the extremes, whilst only very few points are sheltered from the wind. Once exposed to the wind two things may happen. (1) In those sandy tracts which are wholly free from bushes, *barkhans*, described below, are formed. (2) With the gradual hardening of the mass of sand the lighter particles do not remain in the hollows; they are either caught by the roots of the bushes or carried to higher ground, where they are sheltered from some winds by the ridge of the hillock. The wind then carries them over the hillock, but is incapable of laying them in the hollow behind. A wind blowing from an opposite direction may in like manner drift the particles to the reverse side of the eminence, but no farther. This explains the small quantity of drift-sand met with on the roads, and its rapid disappearance.

In sands of the second kind carts move with great difficulty, whilst horses and camels, particularly the latter, go freely. This includes all the sands met with along the roads between Khiva, Akhal, Attok, and Merv, between Mikhailof Bay and Mulla Kari, as well as those on the peninsula of Dardja, though these latter are of a looser consistency, and supply a connecting link with the third kind. Between Merv and Sarakhs they also occur, but only for a distance of about three miles,

* Translated from the Russian 'Izvestiya Imp. Russk. Geogr. Obsch.' vol. xx.

where the road crosses them at a place known as Kutche-kum. The sands between Annau and Gawars occupy an intermediate place between the first and second kinds.

In the sands just mentioned no storm is to be dreaded; the quantity of drift-sand being so small cannot become dangerous, though it causes many discomforts to the traveller, covering his things and filling his eyes, &c.

This, however, is not the case with sands of the third kind, the so-called *barkhans*. Here neither tree, nor bush, nor grass-blade is to be seen; the sand is wholly of a drifting nature; the slightest puff of wind effaces the fresh tracks of a caravan; and it is not without reason that the name Adam Krilgan—man's destruction—has been given to a place in the Khanat of Bokhara where whole caravans have been buried.

Between the Oxus and the Caspian such drift-sands occur but very rarely, and usually in distinct ridges or hillocks. They only occur in the south-eastern angle of the desert, and here only near the river; the farther from Chardjui in a northerly direction and the deeper in the steppe, the rarer are these drift-sands. Along the road from Merv to Kavakla the sands are similar in character for a short distance, covered with a little vegetation, though this only consists of a few isolated trees of saksaul, and the form of the hillocks is distinct from those along the road between Merv and Boyun-uzun, which are bare. Wherever there is vegetation the position of the sands depends not only on the wind, but on the bushes as well, and the coincidence of these two causes produces great variety in the shapes of the hillocks. In the barkhans on the road from Merv to Boyun-uzun this is not the case; here, as in all slightly undulating ground, there is no distant prospect, and when the sands cover the bushes growing on them the horizon is bounded on all sides by low, greyish-yellow hillocks, formed by the wind alone, which produces a similar effect on the whole mass of sand, moulding the hillocks according to one pattern; the side exposed to the wind (northern) presents a gradually raised cone, the reverse a sharp curve, whilst a section might be accurately figured by a rib. The axis of the barkhans runs north-east and south-west, and forms an angle of 20° with the meridian.

The passage of these sands is very difficult; horses sink and are hardly able to extricate their feet. It is necessary to proceed with the utmost caution in order not to lose one's way; there is nothing to serve as sign-posts, nothing to fasten camels' bones to except occasional sticks placed by passing caravans; the wind blows them down, the sand covers them. Each successive caravan replaces them in the most convenient spot. These sticks have to be followed on the march, for when there is the least wind only the most skilful and experienced guides can trace the direction of the road.

The barkhans shift from place to place; plain evidence of their drift-

ing nature is before the eyes of every traveller between Merv and Bokhara. On the road to Kavakla, the roots of trees are exposed to a depth of two to three feet, which should represent the thickness of the sand stratum removed, because the roots of these trees begin almost at the surface. I have never seen more than $3\frac{1}{2}$ feet of roots denuded, and hardly ever prostrate trees. This is explained by the circumstance that the sand removed by one storm is replaced by another, the tree being supported in the interval by its deeper roots. I saw another instance of the transition of barkhans at a *shor* between Adil Well and Boyun-uzun. At the time of my journey the barkhan crossed a well-beaten track which formerly served as the road; to avoid it a second track had already been beaten. This removal of an entire barkhan across a wide *shor* in one mass without undergoing any alteration in shape is a most interesting fact; particularly striking is the slowness of the movement; thus a second track had been beaten before that first occupied had been cleared.

Besides the three kinds of sands described above there are of course many intermediate, but the distinction already drawn is amply sufficient to illustrate the character of the Kara-kum; the more so because, in reviewing the subject of communications, their classification in one or other of these kinds fully determines the degree of facility with which they may be traversed.

As we have stated, there are besides the sands in the Kara-kum *kyrs*, *takirs*, and *shors*.

Firm, clayey (mixed with sand) surfaces, only occasionally covered with sand-hillocks, hardened by vegetation, are known to the natives by the word *kyr*. Far from being flat they usually consist of a row of valleys, alternating with eminences not exceeding 140 to 210 feet in height. The soil is very favourable to locomotion in any weather.

The *takir* is a very hard surface devoid of vegetation, surrounded on all sides by sands almost horizontal, and if sloping at all but very slightly. Externally they present the following distinctions from the *kyrs*. While the latter occupy large expanses of the steppe, particularly north of the Unguz, where they are bounded by a line almost parallel with it, at a distance of 20 versts (13 miles); the *takirs*, on the contrary, extend over limited areas in the midst of sands—never where there are *kyrs*. The soil of the *takirs* is clay, wholly impervious to water, forming during the rains a slippery surface, impeding progress, though they are not usually so sodden with moisture as is supposed, and I have never seen horses' hoof-marks deeper than $2\frac{1}{2}$ –3 inches. The importance of *kyrs* and *takirs*, in relation to the question of water supply, will be mentioned hereafter.

Shors are distinguishable from *takirs* by the quality of the soil: like them they are devoid of vegetation and bare of sand, presenting a similar appearance; their soil, however, is not clay, but ferruginous sand, and

in many places gypsum protruding on the surface. Shores are sometimes dry, sometimes boggy, and in any case not difficult of passage. Lying as they do in the lowest parts of the desert, water is always to be found in them at a depth of $1\frac{1}{2}$ to 2 feet, but invariably brackish.

This description of the Kara-kum would be incomplete were we to omit mention of the so-called dry channels met with in various directions, two of which—the Uzboi and the Unguz—are well known.

The Uzboi has for several years been the subject of special investigation by an expedition appointed for that purpose. Its labours are for the present concluded, and, considering the enormous means at its disposal, it is to be hoped that the results will completely settle the question. In the course of my labours in the Trans-Caspian regions I only came upon the Uzboi in places. Partly from data so obtained, partly from the meagre information which has been derived from other sources, I judge the most probable explanation of its presence to be as follows:—

We know that Aibughir Gulf has been dried up, so to speak, before our very eyes; it is, moreover, highly probable that the Aral Sea reached in comparatively recent times to Charishli and beyond to Bala-ishem by a gulf such as Aibughir (Charishli is 224 feet above the Caspian level, Bala-ishem about 210 feet, or a little below the level of the Aral). Between Sari-kamysh and Bala-ishem there is no kind of channel, but only inequalities in the ground having the appearance of lake-beds; of course, too, after the desiccation of the gulf of the Aral, as the delta of the Amu-daria moved northwards, watercourses were formed between it and Sari-kamysh.

Only from Bala-ishem to Igdi is there a channel bearing unmistakable traces of having been a river-bed along which the superfluous water of the Aral in years of exceptional floods may have had an outlet to the Caspian. Levellings will show how far this stream may have gone; but already near Aidin a level is reached below that of the Caspian, and there can be no doubt that all this part of the Uzboi forms the bed of a gulf of that sea, the drying up of which may probably be explained by the alternations in its level and the influence of atmospheric causes on the shallow gulf.

But whatever scientific results may be obtained from the labours of the expedition,* there is no longer any doubt of the impracticability of

* It is much to be desired that the results may be published *in extenso*, and not in the form of an abstract merely, or of any project for turning the Amu-daria into the Caspian Sea. Persons appointed for the special purpose of elaborating a project to unite the two seas may naturally be carried away by the grandeur of the idea and not weigh impartially favourable and unfavourable circumstances. Considering the importance of this question it should be considered from every point of view; the facts ascertained should, therefore, be accessible to all interested in the work, and not merely to those engaged in it, for however disappointing the results may prove in a practical sense, the surveys would be invaluable in connection with those made in the Kara-kum,

adapting the Uzboi to connect the Aral with the Caspian. It must be understood we are here speaking of effecting such a connection by merely turning the river; in many places there is absolutely no channel for hundreds of versts; in others gigantic works would be requisite for the passage of water; by wasting many tens of millions an artificial river-way might be created, but its adaptability for practical purposes would be out of the question. Supposing that trade were to develop, or that its probable development depended on the construction of elaborate means of communication, even then the choice would lie between a canal and a railroad, and either one or the other would cost immeasurably less than an artificial river.

Of the Unguz, or so-called Charjui channel, I shall speak more fully. Up to the spring of the present year (1883) information concerning it and the larger part of the Kara-kum was almost all from hearsay, though closely affecting the question of communications between Akhal, Khiva, and Bokhara; only part of the desert west of Sheikh had been surveyed and mapped by the topographers of the expedition to examine the old channel of the Amu-daria, and 20 versts of the Unguz had been described by Lieut. Kalitin.* In the month of March, this year (1883), therefore, by order of the commander-in-chief of the trans-Caspian region, I formed an expedition to examine the Unguz and several routes in the Kara-kum. For an escort and for carrying out the manual labour, ten horsemen of the Tekkeh militia with an interpreter were assigned, and ten camels with three drivers to carry baggage and provisions.

The following was the programme of the commander-in-chief:

A. Survey and description (1) of the Unguz from Bala-ishem on the Uzboi to the Amu; (2) of the road from Kizil-arvat viâ Sansys and Bestem Shah to Kurtys on the Uzboi; (3) of the road from Khiva to the Tedjend and Askabad. These surveys were executed by me as proposed; they were effected with Stephan's compass mounted on a tripod; men on horseback served for sights; distances were measured with an odometer fixed to the front part of an ammunition waggon taken specially for this purpose; not being heavy it was drawn without difficulty by a laden camel even through drift-sands.

B. Barometrical levellings along all the routes with corresponding aneroid readings taken simultaneously. For this purpose we advanced in two parties of five men each at a distance of four to five versts apart (one hour's ride) and at stated times wrote down the aneroid readings; to mark the place where an observation had been made by the leading aneroid, a signal flag was left, near which the second observer halted,

and which have yet to be completed. Lastly, let the cost of publication be what it may. the amount would be quite insignificant by the side of the enormous expenditure of surveying.

* Proc. R.G.S., vol. iv., New Monthly Series, No. 4 contains a translation of Lieutenant Kalitin's paper

and when he went away removed it. The first aneroid readings were taken by me, the second by my coadjutor Lieutenant Khabaloff. Levelings were made along the road from Kizil-arvat to Kurtysh and along the Unguz. On returning from Khiva to Askabad the heat and want of water prevented us from travelling all together. M. Khabaloff proceeded from Khiva via Bala-ishem to Akhal, when he described that part of the road from Sansys to Bami for the first time. I returned as intended via Mirza-chileh and Tedjend, so that by this line single barometrical observations only were taken.

We proceeded to the Kara-kum from Kizil-arvat; the route hence via Sansys to Kurtysh and Bala-ishem will be described below with other roads leading from Akhal to Khiva; * I will at once speak of that belt of the Kara-kum through which passes the Unguz, and will quote extracts of my journal relating to this part of the desert.

"On the 12th April I started from Bala-ishem; there were 500 versts (330 miles) to be crossed to the Amu-daria, the whole distance without roads. The most difficult part was on the first day, viz. between Bala-ishem and Islam-kui, the sand-ridges here being for the most part loose, with steep gradients on either side. Having gone 22 versts (15 miles) we extricated ourselves from them and descended to the Unguz, proceeding along the lake-beds, which after the irregular sands traversed produced the impression of a channel covered with drift-sand. This illusion, however, was speedily dispelled, for on looking to the right and left precisely similar hollows met our view. Between Bala-ishem and Laila, said our guide, 'there are five Unguzes,' and in fact there are more, judging from what we saw. The whole surface is broken into hollows; a row of them surveyed and reduced on a small scale map produces the appearance of a channel. The sides of these declivities are 100 feet high, composed of marly clay with layers of sandstone; the bottom is ferruginous sand with frequent outcrops of gypsum both along the sides and bottom. These hollows are separated by high banks and are also encumbered with smaller ridges extending like dams across them and occasionally meeting from opposite sides. After about an hour's progress through them we halted for the night at Islam-kui. Here there are seven wells; formerly there were many more, but the rest are now choked up. Water is obtained 38 feet below the surface and is about 14 inches deep with a brackish taste, becoming nearly sweet, however, after heavy rains. It is eagerly drunk by sheep and camels, and its temperature is 11.5° Réaumur. (58° Fahr.). From Islam-kui a road leads to Laila and Kurtysh.

Thirty-five versts (23 miles) to the east of Islam-kui, the surface of the country is again broken by a row of lake-beds; their bottom very rarely forming a takir. Shores on the other hand are frequent, and occasional *kaki* or rain-trenches, conspicuous in the distance by the dense

* This route is omitted in this abridged translation.

vegetation surrounding them, may be seen, while between the hollows are very considerable expanses of kyrs. Farther on, the channel entirely changed in appearance and the lake hollows discontinued. To the north of our road passed a line of steep cliffs, seamed by transverse valleys running nearly from north to south. On the south of us were sands, the intervening space between these and the cliffs becoming greater as we proceeded, the latter receding far to the north, while the sands on the south disappeared from view. We marched over kyrs from which there rose occasional cone-shaped hillocks, consisting, like the cliffs along the whole of the Unguz, of marly clays stratified with limestone. These hillocks are particularly numerous near the wells of Sheikh and have even given a name to the locality—Kyrk-gulbeh, i. e. the forty hillocks. Several of them contain in the limestone formation large quantities of sulphur, such for instance are those occurring 12 miles to the north of Sheikh (on the road to Laila), known throughout the country as the hillocks of Dervaz-kyr, whence all the Turkoman tribes and the Khivans have long since obtained sulphur for the manufacture of gunpowder, and which have been extensively worked. The nearer the wells of Sheikh, the less frequent are the kyrs, which are here replaced by sand occasionally interrupted by takirs. These wells, framed with saksaul wood, are with the exception of one choked up; water is obtained 21 feet below the surface, with a depth of $4\frac{1}{2}$ feet, abundant in quantity and good in quality. They are situated on an extensive takir, having a north-westerly direction and forming the continuation of a row of lake-beds and generally uneven ground, having nothing in common, however, with a river-channel.

Half-way between Sheikh and Damla we passed through sands and occasional takirs, the sand-hillocks having a height of 56 to 70 feet above the surrounding country.

We here descended again to a row of shors, bounded on the north by cliffs 150 to 200 feet high like those we had passed, and on the south by sands. The shors consisting of iron sand were most diversified in colour—yellow, red, violet, &c. Everywhere gypsum protruded, in some places crystalline, in others amorphous and disintegrated, so that our horses sank three or four inches. The crystalline gypsum forms in many places a very thick layer on the surface, with thin scales resembling the leaves of a half-open book, and appearing in others as large crystals, or scattered over the surface in small sparkling grains.

Some of these shors, covered with sand, stretch continuously for versts; they are mostly swampy, but some are dry, brackish water being obtained at a depth of $1\frac{1}{2}$ to 2 feet. North of the cliffs for a considerable distance are kyrs, for the most part seamed by deep ravines, where we left the Unguz, and took a northerly direction, for instance at Mirza-chileh, Dashadji, Edi-kulateh and other places. In general, here and farther on, the Unguz presents the appearance of anything but a river-

channel. It may rather be compared with the foot of some cliff such as the chink or scarp of the Ust Urt, with which it also bears comparison in height, both being about 200 feet above the surrounding country. The cliffs of Unguz are seamed and decomposed by atmospheric causes, and their débris helps to form the sands lying to the south.

But the fact of the loosest sands being found near the Amu-daria leads to the inference that they are partly deposited by the river floods.

The position of shores in the lowest points at the foot of the cliffs probably depends on the cause mentioned above, applicable to all low-lying ground in the midst of sands; when exposed to all winds the sand having nothing to hold to, drifts to the summits; thus in open low-lying tracts along the Unguz there remains a belt of bare surface. Here the moisture caused by rainfall accumulates and forms swampy shores, whilst in many other places sheltered from some winds the sands approach the very cliffs.

These two formations, kyrs and sand, alternate along the whole extent of the escarpment to Chalganak, while the farther east the more decomposed is this Chink, till at length it is broken into a row of detached hillocks some 70 to 100 feet high, hardly connected by a ridge less than 20 feet, with headlands ever becoming narrower and valleys widening. Almost immediately beyond Chalganak the cliffs recede, at first in a due northerly direction and afterwards run parallel with the Amu.

The sands as far as Chalganak are of the second, and occasionally of the first order; it is only between these wells and the river for a tract of eight miles, that barkhans entirely composed of drift-sand are situated. It is very remarkable that all the roads leading from Merv to the Amu-daria cross such barkhans, and it is highly probable that they belong to a continuous belt lying parallel with the Amu-daria, and formed by the deposits of its floods. These are drifted into barkhans and gradually harden as they move towards the west.

After all that has been said, it is hardly worth while speaking of the practical importance of the Unguz, i. e. its adaptability for being utilised as a river-way for the Amu to the Caspian sea. There is hardly one section of it resembling a river-channel or suitable for a watercourse without enormous labour; while the unevenness of the ground and the large tracts of sand offer obstacles to the digging of a canal which must be considered as practically insurmountable.

GEOGRAPHICAL NOTES.

Our New Librarian.—The Council have appointed to the post vacated by the lamented death of Mr. E. C. Rye, Mr. J. Scott Keltie, the Editor of the 'Statesman's Year-Book,' who is just now completing the special work on which he has been engaged for some months, as the Society's Inspector of Geographical Education.

Mr. H. E. O'Neill, the successful explorer of the region between the Mozambique coast and Lake Shirwa, arrived in England on the 24th of March, on a short leave of absence from his post as Consul at Mozambique. It is expected that he will give an account of his most recent journey, viz. from Blantyre to Quillimane, by a new route overland, at our evening meeting of April 27th.

German Annexations in East Africa.—We are able to give a few facts concerning the territory in East Africa which has been recently brought under the protection of Germany. This has been accomplished through the medium of the Society for German Colonisation in East Africa, which sent out a party for the purpose last autumn. The Society's chief envoy, Dr. Peters, has concluded treaties, in which no flaw can be found, with "ten independent sultans," representing Useguha, Nguru, Usagara, and Ukami. The area of this region is represented in the Berlin journals as about 60,000 English square miles, but we have the best authority for stating that it does not exceed 2500 square miles. It embraces only small portions of the above-named countries, situated on their common frontier. The commercial importance of this region is great; through it passes the central trade route between the coast and Lake Tanganyika. After the 50 to 80 miles of unhealthy coast region, there are large areas in these territories with picturesque tree-clad mountain ranges surrounded by fertile plains stated to be well adapted for European residents. The valleys are fertile, and abound in valuable woods; the country as a whole is well watered, the people intelligent and docile, and capable under a humane civilised tutelage of great development. The Wa-nguru, Wa-sagara, and Wa-seguha all speak nearly the same dialect. It has been generally considered, it should be stated, that the authority of the Sultan of Zanzibar extends inland for 450 miles.—While the Germans have been making these annexations in East Africa, the King of the Belgians has resolved to abandon all the stations of the Association east of Lake Tanganyika. The chief of them is Karema on the east coast of the lake; but those who remember Mr. Joseph Thomson's account of the place will think that the Association is well rid of it.

Trade of East Africa.—In the Journal of the Society of Arts for March 13th is a paper by Mr. F. Holmwood, H.B.M. Consul at Zanzibar,

on the trade between India and the East Coast of Africa, which deserves the attention of geographers. Mr. Holmwood, after touching but very briefly on the trade of Natal and the Portuguese possessions, dwells at length on that of the territory under the Sultan of Zanzibar. This extends from Tongy Bay, in S. lat. $10^{\circ} 40'$, to Warsheikh, in N. lat. $2^{\circ} 20'$. Moreover, Mr. Holmwood points out that the Sultan's authority is recognised along the trade routes at least for 700 miles in the interior, and many chiefs away from these routes acknowledge the Sultan's suzerainty. The Sultan owns 1050 miles of coast, besides islands. The island of Pemba Mr. Holmwood describes as one vast clove plantation. There are several excellent harbours along the coast. Mr. Holmwood speaks well of the Government of the Sultan, autocratic as it is, and points out that English influence is absolutely ascendant. Of the foreign residents in Zanzibar in 1884, 6619 were British subjects (89 British born), 39 French, 13 German, 8 American, 5 Belgian, 2 Italian. Since the abolition of slavery in 1873, after a year or two of depression, the trade has doubled. The total trade with India alone has increased from 428,800*l.* in 1879 to 755,858*l.* in 1883. Mr. Holmwood insists on the great importance of Zanzibar to England, and the immense variety and commercial value of the products of the country. He suggests that in the Indian and Colonial Exhibition of 1886 there should be a special Zanzibar section, with specimens of the various types of people. The suggestion deserves consideration. Mr. Holmwood briefly referred to the immense possibilities of development of the inland regions, now almost depopulated through the slave trade, and made special mention of the Kili-manjaro region, both as a sanatorium and as a field for industrial exertion.

M. Giraud.—M. Giraud, whose return to the coast at Inhambane, from the scene of his adventurous attempt to reach the Upper Congo from Lake Tanganyika, we have already recorded, has arrived in his native country, and has been deservedly welcomed with acclamations. Landing at Marseilles, he lost no time in giving the Geographical Society of that city an account of his adventures and discoveries. We have at various times during the past year recorded the progress of the young explorer, and must wait for his detailed narrative before we can give any additions of importance. We may only remind the reader that he has added greatly to our knowledge of Lake Bangweolo, much of whose surface he navigated in his steel canoe. He found that the Luapula leaves the south-west corner of the lake, as found on Mr. Ravenstein's map, and not the north-west, as given by Livingstone, and flows 150 miles south-west before turning to the north. M. Giraud sailed down the river for three days until stopped by cataracts and an army of hostile natives. After his escape he proceeded to Cazembe and Karema, intending to strike north-west to Stanley Pool, which idea, however, he was compelled to renounce, and return to the coast.

Dr. Lenz's Proposed Expedition to the Region between the Congo and the Nile.—We can only refer at present to the proposed expedition under Dr. Lenz to complete the exploration of the interesting and scarcely known region between the Congo and the Nile, and, if possible, render assistance to Emin Bey and Lupton Bey, as well as Dr. Junker and Signor Cassati. The expedition will be supported partly by the Austrian Government, partly by the Vienna Geographical Society, and partly by private subscription. It is expected that the Geographical Societies of Berlin and Munich will join the Vienna Society in the expedition.

Captain Chaddock's Visit to the Limpopo River.—The February number of the 'Mercantile Marine Service Association Reporter' contains an article by Captain G. A. Chaddock, descriptive of his recent visit to the Limpopo river (native names, Inhampura, Inhapallala, Inguenia, Oori, or more generally Meti or Meté). The party sailed from Liverpool on the 25th of September, 1883, in the steamer *Maud*, and after a stay of nearly two months in Natal, they arrived off the mouth of the river on the 14th of April, 1884. Entering by the southern channel, Captain Chaddock succeeded in crossing the bar, the current running out at about four knots per hour. The channel was found to be very narrow, with a depth of no less than $4\frac{1}{2}$ fathoms of water. A long sand-spit runs for a distance of three miles in a line with the coast, and forms a natural breakwater, with an opening of about three-quarters of a mile to the other shore forming the river-mouth, the water at which is perfectly fresh and drinkable. The land about here is composed of high sandhills, slightly covered with short undergrowth; one of these hills at a distance appears to be of an intense reddish colour, and forms a good guide for indicating the mouth of the river, being clearly distinguished from eight to ten miles off. The river is described as being narrow and deep, the surrounding country low and level, very thickly populated, and as far as they went the land appeared to be well adapted for agricultural or sugar-raising purposes. The country, except at the mouth of the river, which for a distance of about twelve miles is thickly fringed with mango trees, is almost devoid of any material suitable for fuel. A few miles from the highest point reached (Manjoba's kraal) the land becomes high and is well wooded, and it was reported that this high land continued inland, and the country perfectly healthy. Captain Chaddock is of opinion that this river is navigable, and, unlike most African rivers, free from falls or any obstruction as far as the Transvaal. On the 19th of April the party started from "Manjoba's kraal" on the return journey, reaching the mouth of the river on the 22nd. The *Maud* is believed to be the first craft to enter and navigate the Limpopo river.

The Origin of the Malagasy.—In a note in the ‘Antananarivo Annual,’ No. viii., the Rev. J. Sibree states that in the month of September last, a number of small pieces of pumice were sent up to the capital from Tamatave, where they had been washed ashore not very long before that date. The pieces are rounded by the action of water, and are supposed to have come across the Indian Ocean from the Straits of Sunda, where they were probably ejected during the tremendous eruption of Krakatau. If this supposition is correct, it supplies not only an interesting illustration of the distance to which volcanic products may be carried by ocean currents, but also, Mr. Sibree thinks, throws a light upon what is still rather an obscure question, viz. How did the Malayo-Polynesian ancestors of the Malagasy come across the 3000 miles of sea which separate Malaysia from Madagascar? It is evident from the fact of pumice having come across this great distance, Mr. Sibree states, that there is a prevalent “set” of oceanic current in this direction; and it is therefore a confirmation of what has been thought by several writers, viz. that in prehistoric times, single *prahus*, or even a small fleet of them, have occasionally been driven westward by a hurricane, and that the westerly current has then brought them on still further, until at length these vessels have been stranded on some part of the coast of Madagascar, stretching north and south, as it does, for nearly a thousand miles.

Corea.—We have two recent papers on Corea before us. One, in the February and March numbers of the Austrian ‘Monatschrift für den Orient,’ by “a high functionary,” dated from Shanghai, the object of which is to give a complete account of the recently opened country in all its aspects. The other will be found in No. 3, 1884, of the Bulletin of the American Geographical Society. It is an account by Mr. S. B. Bernerston, of the U.S. Navy, of a trip from Söul to Peng Yang, apparently in July 1884. Peng Yang is the capital of the North-east Province, Puing-an-do, and the second city of importance in Corea. The distance between the two cities is over 200 miles, and Mr. Bernerston gives many notes by the way. Song-to, three days’ march from Söul, has walls probably as great as those of the capital, yet the town inside has so dwindled away that a large area is occupied by cultivated land. At Peng Yang Mr. Bernerston was well treated. It is more a commercial than a manufacturing centre, is built on a range of hills on the north bank of the Ta Tong, and has seven gates. The two principal streets run at right angles to each other. Between the city and the sea a stretch of about 60 miles of river remains unsurveyed, and should this prove navigable, the establishment of a treaty port at the mouth would cause a brisk trade to spring up at a rich and very important commercial centre.

The Chinese Province Sze-Chuen.—A further official Report* of Mr. Hosie (China, No. 2, 1885) has been published, containing his journey

* *Vide* Proc. R. G. S., February No., p. 120.

through Central Sze-chuen in June and July last year. Mr. Hosie started from his Consular Station at Ch'ungk'ing, on the central course of the Yang-tse, his main object being to collect information on the subject of insect white wax for Sir Joseph Hooker. Mr. Hosie's bright and readable narrative abounds with topographical details as to towns, rivers, and the general features of the country, with valuable notes as to products and industries. He and his reluctant companions did a small feat of mountaineering in climbing the lofty mountain O-mei, near the city and river of that name, in company with crowds of pilgrims who visit the shrine of Buddha on the summit. In an appendix is given a detailed account of the insect white wax (the insect-tree, the insects, the wax tree, the wax) which is both of scientific and industrial value. Another appendix is occupied with a tabulated itinerary, giving distances from Ch'ungk'ing, mean of observed temperatures, and remarks on each place touched at.

Flora of Ceylon.—At the meeting of the Ceylon branch of the Asiatic Society on February 20th, Dr. Trimen read a paper on the Composition, Geographical Affinities, and Origin of the Ceylon Flora. The Systematic Catalogue of Ceylon Plants which Dr. Trimen presented to the Society includes about 3250 species, of which the odd 250 may be reckoned to be Ferns and the 3000 Flowering Plants or Phanerogams. Of these 3000 he first called attention to those among them, 285 in all, which, though more or less wild plants, were not native; but aliens, colonists, denizens, or casual waifs and strays. There are numerous foreign fruit-trees and many tropical weeds. A comparison with some other areas of the globe, temperate and tropical, was made, and the conclusion arrived at, that, though less so than was formerly supposed, the Ceylon flora was a rich one for its position, and probably more so than in any equal area in India.—The remarkably large proportion of *endemic* species, i.e. species peculiar to the island, viz. 786 (or 29 per cent.), was remarked as probably larger than that of any other continental island except Madagascar. Comparisons were made in this respect with other countries, from the British Isles with over 1400 species and probably none endemic, to New Zealand with 72 per cent. peculiar, and the richness of true oceanic islands in this respect alluded to. Ceylon, Dr. Trimen showed, has derived the bulk of its flora from continental peninsular India, only about 130 species (besides the endemic ones) not occurring there. The separation of the northernmost part of the island from the mainland was shown to be geologically recent. Of endemic *genera* Ceylon only possesses 20, and these contain 48 species. Of the endemic species, all but about 73 are members of genera also represented in peninsular India. But there are also in Ceylon species of genera, not met with in peninsular India, identical with those of other countries. In all, no less than 100 genera of flowering plants are represented in Ceylon which are not found in the peninsula. Nearly the whole of these are natives of the hot wet districts of South-western Ceylon; a very few are mountain types, but these are not endemic though of interest as not occurring in the Nilgiris. The affinity of these non-peninsular genera was shown to be in the great majority of cases *Malayan* (as opposed to Indian), including in the term not the Malay Peninsula and Archipelago, but the Andaman and Nicobar Islands and the northward extension into East Bengal through Burma.—The question of how this flora reached South-western India and Ceylon was next considered. Mr. Wallace's view of the elevation of the northern part of the Bay of Bengal in Miocene and Pliocene times, when the Indian peninsula was an island, was con-

sidered. The remarkable affinities of some genera of plants rather with Borneo and Java, than with the Eastern Bengal flora led to the expectation that the former means of transit was rather at a lower latitude, at or near the equator, but there is no evidence of this available.—Dr. Trimen called attention to the Indo-Ceylonese region of zoologists characterised by a few endemic genera in the fauna. He pointed out that apart from the Malayan type the flora did not give very clear evidence of any other element peculiar to those districts, but mentioned some endemic genera in both which were not especially Malayan in character. As for the other parts of Ceylon, at least four-fifths of the island, all north-east and north-west, present almost precisely the floral characteristics of the Carnatic, the endemic species being closely allied to those of that district of Southern India. With regard to the flora of the mountains of Ceylon and the Nilgiris, it is simply a southward extension of the Himalayan; there were no endemic genera though such a vast number of endemic species, and every genus is also Himalayan; there appears to be no Malayan admixture.—The few Mascarene and tropical African affinities in the flora were discussed, and their existence held to show the probability of the passage across the Indian Ocean in past times by the aid of the former large islands marked by the banks and coral reefs of the Carcados, Chagos, and Maldives. The latter land must have approached very near to Ceylon and played doubtless an important part in the history of the formation of its flora.

German New Guinea.—It may be well to record the names which the Germans have introduced into their recent acquisitions in New Guinea. The whole German protectorate will be called König Wilhelm's Land. A newly discovered harbour north-west of Port Constantine, in Astrolabe Bay, is named Friedrich Wilhelm's Hafen, after the Crown Prince, and a bay near it (not Astrolabe Bay, we hope) Prinz Heinrich's Hafen, after the Crown Prince's sailor son.

Geographical Enterprise in Canada.—From the Annual Report of the Geographical Society of Quebec, we learn that the Society is devoting much of its attention towards the opening up of the northern territory of the Dominion. A survey of Hudson Bay is already in operation; seven winter stations having been posted to report on the nature and movements of the ice in that inland sea. This survey is expected to return within the year.—We have received a notice respecting the organisation of a "combined scientific, sporting, and health expedition" to visit, during the coming summer, Great Lake Mistassini. The proposed expedition is to start on the 10th of June from Quebec, and will proceed by steamers of the St. Lawrence Navigation Company, up the Saguenay river; next by carriage to Lake St. John; thence by bark canoes by way of the Chamouchouan and Nikoubau rivers and Perch, Narrow Ridge, Whitefish, Abitagamou and Chibagamou Lakes—sheets of water between 15 and 30 miles long—to Abatagoush Bay on Mistassini. The expedition will return by a different route, crossing Little Mistassini Lake (over 100 miles long), catching distant views of the Otishe Mountains of Labrador, which rise 3700 feet above the sea-level, and ascending the Rupert river to Lake Themiscamé, thence across the Height of Land and by a chain of lakes around the head-waters of the Mistassini and Hay

rivers to the Chipshaw and Peribonca rivers and back to Lake St. John and Quebec. The length of time occupied by this expedition will be between 80 and 90 days, and it will return to Quebec about the beginning of September.

Danish Exploration of Greenland: Programme for 1885.—The tenth expedition which the Danish Government has sent out since 1876 for the purpose of exploring Greenland left Copenhagen on March 24th in the *Thorvaldsen*, Captain Amdonsen. The expedition is commanded by Lieutenant Jensen of the Danish Navy, who has already been on four Greenland expeditions. The purpose of this expedition is to examine the hitherto little known tracts of land between the coast and the inland ice, and to survey the coast between Sukkertoppen and Godthaab, $65\frac{1}{2}^{\circ}$ – 64° N. lat. If Lieutenant Jensen succeeds in finishing the work this year, the west coast of Greenland from $72\frac{1}{2}^{\circ}$ to $61\frac{1}{2}^{\circ}$ N. lat. will have been surveyed since 1876, besides the greater part of the Julianehaab district, the southernmost part of Greenland— 61° to 60° N. lat. Considering the many difficulties in the way of exploring a country like Greenland, a great deal has been accomplished by the Danish Government, and much information published on the orography, geology, and botany, as well as concerning the monuments of the early Danish colonists. The other members of the present expedition are Lieutenant Ryder, of the Danish Navy, a promising young officer, who has been in Greenland with Lieutenant Jensen before, and Dr. Hansen, who will undertake the natural history collections and anthropological observations on the Eskimo. The expedition which was sent from Denmark in the spring of 1883, under the command of Lieutenant G. Holm, to examine the east coast, has wintered on that coast, and is expected to return next autumn, after an absence of two years and a half. Lieutenant Holm is accompanied by Lieutenant Garde, who makes meteorological and magnetic observations, besides a mineralogist, Mr. Knutsen, and a botanist, Mr. Eberlin.

Grinnell Land.—The American journal *Science* for February 27th, contains two articles on the Greely Arctic expedition; one by Lieutenant Greely himself describes the geographical work of the expedition, and the other, by Dr. Francis Boaz, on the configuration of Grinnell Land, is based on information obtained by the writer from natives who are familiar with the region. The conclusions come to by the two writers are essentially the same. Lieutenant Greely believes that future voyages will confirm the indications growing out of his discoveries that Arthur Land is separated from Grinnell Land by a fiord or channel connecting the Western Polar Ocean with Hayes Sound. He also thinks that the northern coast-lines of the Parry Archipelago will be found trending gradually in a northerly direction, and terminating in Arthur Land. He hopes to dwell on these points, and on the remarkably fertile belt of

iceless country found in the interior of Grinnell Land, in a forthcoming narrative. Accompanying these papers is a reproduction of an important map of the U.S. Hydrographic Office, showing the region from Baffin's Bay to Lincoln Sea, based on the discoveries of the *Polaris*, Nares, and Greeley expeditions. Much of this is of course new, not only the outline and configuration of Grinnell Land, but the Greenland coast to the north-east of Robeson Channel.

Alaska.—Several expeditions will be sent from the United States to Alaska during the coming season. General Miles intends to explore the region between the head of Cook's Inlet and the Tavanah watershed, and probably obtain some more accurate knowledge of the Tavanah itself than we at present possess. It is hoped that Lieutenant Ray may command the expedition. A party started on January 30th for the Copper or Atna river, to ascend the river as soon as the ice breaks up, cross, if possible, the divide from the Upper Atna, and descend by one of the Yukon tributaries to the mouth of the latter river. Lieutenant Stoney is reported to have a new expedition newly organised to continue his investigations of the Kowak river. Dr. Everest, who crossed the Yukon Portage last summer, reports from Fort Reliance, Yukon river, his safe arrival there July 22nd, 1884. He intended to ascend the White river last autumn, and, if possible, to cross to the Copper river this spring, and descend to its mouth. The country seemed to him to resemble northern Idaho, with rolling hills densely wooded with larch and poplar, and willows along the river-banks, and luxuriant herbage.

Mount Roraima.—Pending the arrival of Mr. Everard Im Thurn's detailed account of his ascent of the previously unascended Roraima, a few further notes in addition to those given in previous numbers may be of interest. In his letter of December 6th, for example, he mentions a curious result of unguided missionary effort among the Indians in the Savannah about the Ireng and Cotinga. Each village has built itself a church, and in these buildings, men, women, and children spend six hours a day for six days out of the week, and eight hours on the seventh day in repeating the Creed, the Lord's prayer and the Ten Commandments, evidently with no comprehension of their significance. Mr. Im Thurn mentions other curious features of the crude Christianity of these people, which, when his full narrative is published, will interest ethnologists. One result is that every one neglects the ordinary duties of life, and food is scarcely to be had.—A later account, in the *Argosy* of February 7th, states that Mr. Im Thurn and his companions returned to Demerara on the previous Saturday, after having successfully accomplished the ascent of Roraima. Mr. Im Thurn had suffered much from fever, but at the above date was fairly on the way to recovery. On December 7th he and his companions ascended half-way up the mountain and built four huts. From the foot of the incline up to about 5500 feet above the sea-level

is a grassy undulating slope, broken only by occasional groups of trees and broad bands of boulders. It was at this height the huts were built, beside an open grassy swamp, and so far had Schomburgk and previous travellers ascended. Just beyond that swamp the slope becomes much steeper, and is densely covered with low trees, principally palms, of the genus *Geonoma*. The forest-covered slope runs right up to the base of the cliff, where it is crossed by a broad belt of bramble very closely resembling the British blackberry, *Rubus Schomburgkii*, mixed with a large bracken, also very closely resembling the English species. A plant of the genus *Befaria*, which, though really not a heath, close resembles ordinary English heather, is found in great profusion; the result being that that particular place reminds one vividly of an English common. Above the bramble belt the perpendicular cliff rises to a height of 2000 feet, except at one point, where a ledge runs diagonally up the face of the cliff. The first two-thirds of the ledge is covered by immense boulders, bound together by a very extraordinarily dense network of trees. Then a stream is met with falling from the top of the cliff on to the ledge, in which it has worn a deep ravine, whence it descends in a series of further falls to the foot. The chief difficulty of the ascent consists in getting under this fall. Above this point the upward slope begins again, and is covered with a lower vegetation, consisting principally of tall coarse grass, and of the agave-like plant which forms the chief vegetation of the Kaieteur savannah. But among this are large numbers of low-growing very beautiful flowering plants. Above the fall the path is quite easy.—The ascent was made on December 18th. Starting at 7 A.M. the top was reached by 11. The scenery on the top, Mr. Im Thurn states, was of the most marvellous description. The plateau was covered with groups of rocks of the most extraordinary shapes, piled upon each other in heaps. The highest of these piles was about 80 feet. Between the piles of rock were a few stretches of low vegetation entirely filled with plants of a character distinct from those seen elsewhere in Guiana. The clouds, which are nearly always resting on the mountain, constantly deposit their moisture, saturating the rocks and such soil as there is with water. Everything is dripping with water, and this water accumulates in tiny basins, and flows from these basins in shallow streamlets to the edge of the cliff, where they fall over, forming the numerous falls which have been so frequently observed on the face of the mountain. The foot of the slope was reached by nightfall. The only animal life on the top were a few small butterflies of a common type. Many of the plants collected are of species hitherto unknown. From the top many mountains were seen of exactly similar character, stretching away as far as the eye could reach. There is one of very peculiar character, with a brown flat top and very narrow base. Mr. Im Thurn has only told enough to whet the appetite for more.

GEOGRAPHICAL NOTES.

Ascent of the Highest Peak of the Australian Alps.—Dr. R. von Lendenfeld, in a letter to Prof. Cayley, dated Sydney, 24th January, 1885, gives an account of his recent ascent of the highest peak of the Australian Alps. He was sent by the Geological Survey Department of New South Wales to make a scientific investigation of the central part of this range of mountains. Dr. von Lendenfeld found that the peak hitherto considered as the highest, named Mount Kosciusko (measured at 7176, 7175, and by Dr. von Lendenfeld at 7171 feet) is not the highest, and made the first ascent of the highest peak some distance further south. The height of this peak was calculated at 7256 feet, and named by him Mount Clarke. Indications of pre-historic glaciers were discovered at about 5800 feet, and in the glacial period a large valley was filled by a glacier extending 500 feet up its sides. The upper limit of trees lies at a height of 5900 feet. Patches of snow (névés) are found all the year round attached to the lee side of the main range above 6500 feet, another proof of the lower temperature and greater amount of moisture south of the Equator.

The German Geographical Congress.—The Fifth General Meeting of German geographers will be held this year in Hamburg on April 9-11. The exhibition is expected to be of special interest on account of the importance of Hamburg as a commercial centre. Besides the usual maps, atlases, &c., ethnography, natural history, and the literature of geographical discovery will be largely represented. Among the subjects to be brought before the meeting are Antarctic Exploration—its next problems and their solution, by Herr Friederichsen, Dr. W. Erman, Dr. Pechuel-Lösche, Dr. Fischer (Zanzibar), Dr. V. Danckelman, and Herr Westendorp; the Panama Canal, its commercial importance, by Herr C. Eggert and others. Other subjects, on which papers will be read, are,—The Basis of a Geographical Bibliography, by Prof. Theod. Fischer; the Climatic Conditions of Africa with reference to the disposal of the surplus population of Germany, by Dr. G. A. Fischer of Zanzibar; the Surface Configuration of Herero Land, by Dr. Pechuel-Lösche; besides a considerable number of minor papers in various departments of geography.

Meteorology of Devonshire.—We have received the Meteorological Observations for the year 1884, made at Rousdon Observatory, Devon, under the superintendence of Mr. Cuthbert E. Peek. The latitude of this observatory is $50^{\circ} 42' 12''$ N., long, $3^{\circ} 0' 15''$ W. It is situated a short distance within the eastern boundary of Devonshire, midway between Lyme Regis and Seaton. It is near the cliff, at an elevation of 524 feet above mean sea-level, with an uninterrupted horizon over the splendid bay between Start Point and Portland Bill. In this and other respects the situation is decidedly favourable for meteorological observations. The observatory has been well supplied by Mr. Peek with the most trustworthy instruments, and under the care of his assistant, Mr. Grover, regular observations taken daily of the various phenomena which go to make up the climate of a coun-

Under each month the general results are classified in the report, and thus in time a valuable accumulation of data will be obtained with reference to the climate of a fairly representative region of England. Appended to the report is an interesting record of the value of the forecasts issued by the Meteorological Office in 1884. From a daily record kept by Mr. Peek it was found that 61·1 per cent. of the wind forecasts, and 73·1 of the weather forecasts, were reliable; 21·8 of the former, and 17·9 of the latter doubtful; leaving only 16·6 of the former, and 9·0 of the latter unreliable. The special importance of these records lies in the fact that the comparison was made on the arrival of the predictions at the end of the daily periods to which they referred.

Forests and Climate.—To part iii., 1885, of Petermann's 'Mittheilungen' Dr. A. Woeikoff contributes a careful paper on the influence of forests upon climate. It has been generally admitted in a vague way that forests have a distinct influence on climate, but hitherto exact scientific data have been wanting to enable us to say exactly what that influence is. Dr. Woeikoff finds such data in the observations of the Bavarian Forest Meteorological Stations. As general conclusions, it is found that in the warmer months in forests, as compared with the neighbouring treeless districts, (1) the temperature of air and ground is lower; (2) its fluctuations smaller; and (3) the relative moisture greater. The marked lower evaporation in woods as compared with the open, Dr. Woeikoff attributes mainly to the shelter afforded by the trees from the wind. The observations moreover show, as must have been expected, a very considerable influence of forests in increasing the rainfall. But the modifying influences of forests extend considerably beyond their immediate neighbourhood, Dr. Woeikoff shows, and he formulates the general conclusion, that in the western part of the old continent the forest areas seriously modify the temperature of neighbouring districts, and that thus the normal rate of increase of the temperature from the Atlantic Ocean to the interior is not only interrupted, but districts lying further in the interior have a cooler summer than those nearer the sea.

Obituary.

Major-General Karl von Sonklar.—General von Sonklar, for many years an Honorary Corresponding Member of the Royal Geographical Society, died at Innsbruck on the 10th of January last, in his 69th year. Born at Weisskirchen in the Banat, he was brought up in a military school, and entered the Austrian Army in 1839. He first showed his literary power in pamphlets on military subjects. In 1845 his regiment was transferred from Graz to Innsbruck. There he found opportunities for exercising his natural taste for mountain exploration and description. In 1849 Count Coronini, the tutor of the present Emperor, took command of Von Sonklar's regiment and soon formed so high an opinion of his Ober-lieutenant's special acquirements, that he obtained for him a post as one of the instructors of the Archduke Ludwig Victor. This position he held until in 1857 he succeeded to the Professorship of Geography in the Military Academy of Wiener-Neustadt, which he occupied for many years.

REPORT OF THE EVENING MEETINGS.

on Sonklar may be considered as having been one of the fortunate few whose lives are ordered that their natural tastes and professional duties coincide. He had a passion for topography in its widest sense and including the consideration of the means which produce it. He spent his vacations in the Alps of Tyrol, where his name was very familiar to the Englishmen who frequented that region twenty years ago as the author of a series of works and maps which first gave any exact information as to the glaciers and structure of the Tauern chain. For the Government surveys of Austria had left all above the snow-line in complete uncertainty, and it was reserved for private enterprise, for Von Sonklar and Payer, to give us any accurate knowledge of the higher Tyrolean Alps. In 1855 Von Sonklar opened the list of his Alpine works by a paper on the Gross Glockner, read before the Viennese Academy. In 1859 he published his monograph on the Hochschwab, in 1861 his map and work on the Oetzthaler Ferner, in 1866 his important book on the Tauern, in 1872 his monograph on the Zellerthaler Ferner.

Von Sonklar was not content to be merely a monographer—an accurate collector of local facts; his topographical works represented his holidays. His professional duties led him to the production of several geographical schoolbooks which are extensively used in the military and private schools of his country. Observation and generalisation were united in the most important work of his life, the 'Allgemeine Orographie,' published in 1873, a book which has excited much notice and criticism. In 1879 Von Sonklar wrote for the series of the 'Anleitung zu wissenschaftlichen Beobachtungen auf Alpenreisen,' published by the German Alpine Club, a volume on 'Orography, Topography, Hydrography and Glacial Action.' He was besides a frequent contributor to scientific magazines.

REPORT OF THE EVENING MEETINGS, SESSION 1884-5.

Seventh Meeting, 23rd February, 1885.—The Right Hon. Lord ABERDARE, President, in the Chair.

ELECTIONS.—William Ireland Buckley, Esq.; General Elphinstone Dalrymple, C.B.; John Hay, Esq.; D. O'Donovan, Esq.; Brig.-General Charles E. Oldershaw, R.A., C.B.; Captain Ross Thompson.

The following paper was read by the author:—

"A Recent Exploration of the King Country, New Zealand." By J. H. Kerry-Nicholls, Esq. (published in the present number, *ante*, p. 201).

Eighth Meeting, 9th March, 1885.—The Right Hon. Lord ABERDARE, President, in the Chair.

ELECTIONS.—W. A. Bailward, Esq.; W. A. Beddoe, Esq.; Alex. St. Clair Bowen Carnegie, Esq.; John Clerk, Esq., Q.C.; Fredk. St. John Gore, Esq.; Captain Patrick M. Lawe, 4th Batt. Royal Fusiliers; W. J. Kelson Millard, Esq., M.D.; Geo. Edw. James Moody, Esq.; Arthur Nelson Pidcock, Esq.; Joseph Pollard Esq., M.A.; J. Brinsley Richards, Esq.; Richard Stevens Sly, Esq.

After some introductory remarks by the President, Mr. Robert Gordon, titled "The Irawadi River," in which he expounded his view that the Irawadi was the continuation of the Sanpo ri

PROCEEDINGS OF FOREIGN SOCIETIES.

Geographical Society of Paris.—January 9th, 1885: M. BOUQUET DE LA GRYE, of the Institute, in the Chair.—The ambassador from Timbuctu, Abd el Kader Ould Baker, El Hadj, whose reception by the Society had been announced to take place, made his entrance into the hall accompanied by his interpreter. He was received by the Bureau, and invited to take a seat on the platform. The Chairman then addressed a speech to him in French, which M. Henri Duveyrier translated for him into Arabic. The address recalled the fact that it was a Frenchman who was the first European to visit Timbuctu fifty-seven years ago, and that the ambassador himself was the first inhabitant of Timbuctu who had as yet come to Europe and to Paris. "We know," said M. Bouquet de la Grye, in concluding his speech, "that you are a man of intelligence, that you possess influence in your town, and the fact of your coming to visit a European country is a proof of your courageous spirit and mental superiority. Welcome, therefore, among us, and be pleased to accept this book of your faith, the Koran, as a present from the Geographical Society, and an evidence to you that Frenchmen are not enemies of the Mahometan religion, and that they are pleased to welcome Mahometans who pay them a friendly visit." The Chairman at the same time presented the ambassador with a magnificent copy of the Koran, which the latter accepted and acknowledged in a few words expressing his grateful recognition of the reception he had met with at the hands of the Geographical Society. He thereupon shook hands with the Chairman, and requested him to proceed with the business of the meeting. M. Bouquet de la Grye then announced that the Commission of Prizes had just drawn up the list of the Society's awards for 1885:—(1) Gold Medal to M. de Foucauld for his journey in the south of Morocco, and his investigations on the eastern extremity of the Atlas range. (2) Gold Medal to Dr. Neis, naval surgeon, in consideration of his four journeys in Indo-China and the unexplored parts of Laos. (3) The Roquette Prize to the Danish work 'Medelelser om Groenland,' published by the Commission of geological and geographical researches in Greenland. (4) The Jomard Prize to M. Leroux, publisher, for the work entitled 'Recueil de voyages et de documents pour servir à l'histoire de la géographie depuis le XIII^e siècle jusqu'à la fin du XVI^e, publié sous la direction de MM. Scheffer, de l'Institut, et H. Cordier.' (5) The Erhard Prize to M. Dumas-Vorzet for his interesting cartographical works. These prizes the Chairman said would be presented at the first General Meeting of the present year.—A naval lieutenant, attached to the squadron now operating in the East, transmitted a map of the northern part of the island of Formosa, about which so little is really known; the map was stated to have been executed on board ship, and autographed at the arsenal of Saigon. At the same time there arrived a coloured map, sent from Tongking by Colonel Guerrier, which indicated the surveys made in the delta by the topographical brigade of the expeditionary corps. This map was accompanied by a short account of the reconnaissances made in the country by the same brigade. Among the presentations of maps was one of the region of Lake Kelbiah and the environs of Kairuan, which was presented by Dr. Rouire, who, it was said, had indicated therein the limits (approximately) of the Sea of Triton. Accompanying the map was a treatise on the geography of Ptolemy, from which, according to Dr. Rouire, we are able to recognise "that the Greek geographer had well designated under the name of Triton the river recently discovered in Central Tunis."—The Secretary then stated that news had at last been received from M. Giraud, naval lieutenant, and read a letter dated 15th of October 1884, from Quilimane at the mouth of the Zambesi. The young traveller announced his intended return to France

during the month of January. From the Belgian station of Mpala, on the coast of the Marungu, M. Giraud set out to prosecute his journey to the west, when he was abandoned by his porters. He was then compelled to renounce his project, and to commence his return to the east coast. At the head of a small caravan, formed at a place to the south of Tanganyika, he managed to reach the north end of Lake Nyassa, whence a small English vessel carried him to the Shiré, which he descended, but not without considerable danger consequent upon the strife raging between the Portuguese and the natives. At last he arrived at the Zambesi, and then at Quilimane. M. Giraud appended to his letter a sketch of his itinerary.—In his despatch of the 20th of November 1884, M. Ledoulx, French Consul at Zanzibar, mentioned the foundation by the missionaries of the Holy Ghost of a new French station in the interior of the continent, viz. at Kunzagira on the left bank of the Kingani. The country, he said, was fertile, well-wooded, and abundantly watered. The climate was salubrious, and the inhabitants well-disposed towards foreigners. At Zanzibar the Consul had had an interview with the English traveller, Mr. H. H. Johnston, who had returned from his expedition to Kilima-njaro, where he had attained an elevation of 14,000 feet, and established several observations at different altitudes.—M. François Deloncle forwarded an account of the geographical results of the last exploration (Feb. to June 1884) made by him across the Isthmus of Malacca. Having penetrated the Malay Peninsula as far as Singora (7° 14' N. lat.) the expedition pushing forward into the interior along broad and deep channels, arrived at an inland sea, which no European had before visited. This sea presented the most strange configuration, being dotted over with islands of firm hard limestone, which were covered with swallows' nests. The lake was called Tale-Sab, and was about 20 feet deep (6 metres), 45 miles long, and 12 broad at its widest part. The water was fresh during the prevalence of the north-east monsoon, and salt during that from the south-west. The expedition then proceeded to Penang, obtaining the hydrography, unknown up to the present time, of all the coast. The engineers who formed part of the expedition had obtained geological sections of the whole region traversed, as well as specimens, the analysis of which had revealed the existence of numerous bearings of auriferous quartz, tin, and iron in this *terra incognita*.—Persia formed the subject of some communications forwarded by one of the Shah's ministers, his Excellency Mohamed Assan Khan Saniedouleh, a member of the Society, who presented several of his works. Among others was the first volume of an account of a journey in Khorassan (the following volumes were stated to be in the press). The correspondent promised to send some notes on several provinces of the Empire, across which he accompanied his Majesty the Shah in the course of a recent excursion.—A letter was read from M. Edmond Cotteau, dated 9th November last on board the *Vire* (lat. 27° S., long. 162° 43' W.), who stated that he was proceeding from New Caledonia to Tahiti. During his stay in the first-named of these colonies he had been able to make a journey to the New Hebrides. The most beautiful island in that archipelago was that of Vaté or Sandwich, a magnificent island, well watered, extraordinarily fertile, on which a dozen Europeans were living. The cultivation of coffee was attended in the island with marvellous success, but unfortunately there was a lack of labour, the natives of the isle, like those in New Caledonia, being disinclined to work in a regular way. From Port Vila M. Cotteau proceeded to Port Havannah (on the north-west of the same island), the situation of which was in no way inferior to the first-named port. He then set sail for the island of Api (about 62 miles to the north of Sandwich), which was rarely visited by Europeans. His letter stated that the luxuriant nature of this island surpassed, if possible, in beauty that of the island he had just left.—Communications were received from Saigon bringing information regarding the journeys

of Captain Aymonier in Indo-China, from October 1883, to April 1884. All the northern part of Laos and the basin of the Mun had been traversed by him. During his travels he had collected many valuable epigraphical documents and numerous notes on the geography of the country. A *résumé* of these explorations would appear in the work entitled 'Excursions et Reconnaissances en Cochinchine.' On the 10th December last M. Aymonier was to start from Saigon on a journey to the province of Bin-Thuan, in order to study the monuments which the Chams might possibly have left there.—M. Michel Venukoff communicated several items of geographical information on Russia. He announced that M. Conchine had just formulated the definite results of his researches with reference to the bed of the Amu-daria. According to him, this river never was a direct affluent of the Caspian Sea, but it was probable that indirect communication between two masses of water, one fresh and the other salt, did exist at one period by means of the Sary-Kamysh and the Uzboi. M. Venukoff also stated that the account of Professor Sorokine's journey in the central Thian-Shan mountains had just been published. Dr. Régel was stated to have completed his travels in Karateghin and Hissar, and had returned with his collections to Tashkend.—Information was received from Prince Roland Bonaparte regarding the expedition of M. D. Veth, the famous explorer of Sumatra, who started last summer from the Netherlands for South Africa, intending to cross the continent from west to east. Before arriving at his destination, M. Veth intended to touch at various points on the west coast of Africa and to visit the French colony of Gabon and make a long stay at Banana at the mouth of the Congo. MM. Van der Kellen and Goddefroy, who formed part of his expedition, had preceded him. One of them had already ascended a long way up the course of the great African river. M. Van der Kellen had got together a large geological collection. The Prince, who published in the quarterly *Bulletin* of the Society (4th part, 1884), a work on New Guinea containing information on the journey of the Resident, M. Van Braam Morris, along the north coast of this island between Humboldt Bay and the mouths of the river Amberno, said that in the month of July last M. Morris had ascended the great Papuan river as far as 2° 20' lat. S., which represented according to Swaan's large map, a journey of approximately one degree of latitude. The Dutch, added the Prince, did not enforce in a platonic way their indisputable rights over the western half of New Guinea, they explored this island with the greatest ardour and zeal.—M. Denis de Rivoyre, presenting a new work ('*Les Vrais Arabes et leur pays*,' Paris, Librairie Plon) of which he is the author, said that this book was a sequel to that presented by him last year entitled 'Obock.' He then gave some information on the present state of the last-named colony. The harbour works were making good progress, buildings were being erected, and the inhabitants, confident henceforth of being well protected, were grouping round the French flag. The taking of Tajura and the neighbouring places had had much to do with this result. The Sultan of Aussa, through whose dominions passed the best and shortest route from Obock to Shoa, was in friendly alliance with France. M. de Rivoyre, however, expressed his regret that the action of France was not extended higher up along the shore of the Red Sea. Speaking of the country of the Bogos, he said that that people were by no means inclined to ratify the treaty which the English had concluded with Negus of Ethiopia, authorising that prince to re-establish in the country the suzerainty which his predecessors had imposed on it, the Egyptians having become masters of the country since 1870.—M. Gorceix, director of the mines of Ouro Preto (Brazil), presented various publications having reference to his own speciality and also a map of the Brazilian Empire on the scale 1 : 5,000,000, which he said was a sufficiently large scale for a country whose superficial area was nearly equal to that of Europe, or nearly 3,475,000 square miles (9 million square kilo-

metres). This map had been prepared under the direction of the Minister of Agriculture and Commerce. M. Gorceix endeavoured to destroy the legend which he said was current in Europe and especially in France, according to which the virgin forests covering the Brazilian soil rendered the country difficult of access. These forests were on the contrary quite an exception in most of the provinces, and had been greatly encroached upon in consequence of the cultivation of maize, coffee, &c.—The Chairman then announced that the second series of scientific lectures organised under the auspices of the Society would commence on the Monday following (January 13th). M. Jansen, of the Institute, would open the course with a paper on the Universal Meridian. M. Janssen was the chief of the French delegates to the Washington Conference. The Chairman, in conclusion, called upon M. Paul Fauque to read an account of his journey in Sumatra. Charged with a mission to that island, M. Fauque had studied the character and customs of the natives inhabiting the country of the Siaks and the kingdom of Atchin. Having spoken at some length on their habits of life, the lecturer passed on to the geography, natural history, and mineralogy of this great island of Malaisia. The collections he has brought home have already been distributed among the various museums. In the course of his travels M. Fauque has collected very valuable information with reference to the causes and incidents of the murder of MM. Wallon and Guillaume, French explorers who were assassinated in the year 1880 by the natives of the banks of the Tenom river.

— January 23rd, 1885: M. ALPH. MILNE-EDWARDS, of the Institute, in the Chair.—Having taken his seat as Chairman, M. Milne-Edwards read the names of the Members of the Bureau, which had just been constituted for the present year by the Central Commission. The following had been elected:—President, M. Alph. Milne-Edwards; Vice-Presidents, MM. Germain and Rey; General Secretary, M. Ch. Maunoir; and Assistant Secretary, M. Jules Girard. The Chairman then announced the death of Commander Roudaire, the originator of the well-known project for introducing the waters of the Mediterranean into the vast depression situated to the south of Algeria and Tunis, in order to create an inland sea there. By this channel, easy means of communication would be established with the most remote of the French possessions in Africa, and barren and unhealthy flats would be transformed into fertile plains. He then briefly reviewed the career of the deceased, who since the years 1872 and 1873, when he was charged with geodesical works in the south of Algeria, had not ceased in his strenuous endeavours to crown this scheme with success. It was, he said, M. Roudaire's conviction that the basins of the Chotts were below the level of the sea, and that the sea at one time penetrated there, consequently it could be again introduced into the interior. M. Ferdinand de Lesseps then stated that he endorsed to the fullest extent the words which the Chairman had just spoken in praise of the achievements and persevering energy of Commander Roudaire. M. de Lesseps was well assured that the work of the latter would not perish, and, as he had supported the originator of the scheme, so he would encourage and assist the man who had offered to continue the work of M. Roudaire, viz. Commander Landas, a friend of the deceased, and Professor of Topography at the Military School of St. Cyr. M. Landas, who was present, was then introduced to the meeting by M. de Lesseps. At the time of his death M. Roudaire was getting ready to return to Africa, with the view of pursuing his investigations in connection with the choice of the most suitable position in the Gulf of Gabes for the construction of a harbour for introducing the waters of the proposed inland sea. These operations M. Landas was about to continue. The Minister of War has placed this officer at the disposition of M. de Lesseps.—M. J. Jackson then laid upon the table his annual report upon the condition of the library and collections of the

Society for the year 1884. During the last session 1260 new works, comprising 1537 volumes, had been added to the library, together with 287 maps and 18 atlases. There were now about 35,000 works in the library, including 3300 maps, but excluding the maps of the French Navy, numbering 4000. Periodical papers numbered 642. The societies, institutions, and journals with which exchanges were made by the Society had increased to 345. The Society possessed 103 collections of photographs and views of different countries, besides 1550 portraits of travellers and geographers. Finally, the report stated that during the year just ended no less than 296 persons outside the Society had availed themselves of the privilege, accorded to any one introduced by a member of the Society, of consulting the books and maps of the library. While engaged in going through the collections for the purpose of drawing up the report just analysed, M. Jackson had, it was stated, discovered an ancient description of the coasts and ports of the Mediterranean, the date of which was effaced, but it would appear to belong to the sixteenth century. The author was Jean Oliva, and it was a document of great value. M. G. Marcel, of the map department of the National Library, promised to make a careful examination of this work, and after comparing it with the marine descriptions which that department possessed in large number, to send a report upon it to the Society.—At the last meeting of the Society M. Hansen-Blangsted, who contributed the Scandinavian part of the 'Dictionnaire Géographique' of Vivien de St. Martin, had raised a discussion on the question of the origin and formation of the fiords of Norway. The Chairman on that occasion thought it was a subject connected with geology rather than with geography. The discussion was maintained by M. Bouquet de la Grye, M. H. Blangsted, and Dr. de Broch, former Minister of Naval Affairs in Norway. On the present occasion M. J. Garnier, an engineer, who besides having traversed the greater part of Norway, has travelled in the Alps investigating the mines of nickel found there (he having previously studied and described those of New Caledonia), again brought forward the subject of the fiords of Norway. According to him they are ancient valleys, which in consequence of a subsidence of the soil have become submarine depths. Instituting a comparison, he asked what would happen if the peak of Mont Blanc were suddenly to sink several hundred yards. The valley of the Rhone would then become, he said, an admirable fiord, and the same would take place in the case of the Sesia and Aosta valleys. M. Willm. Huber stated that in his opinion the formation of the fiords was not due to a subsidence of the soil nor to a glacial erosion. He attributed their formation rather to the preservation of the primitive relief of the soil by glaciers. The coasts in Europe presenting the character of fiords were those exposed to the west, such as the western coasts of Galicia, Corsica, Sardinia, and farther north that of Brittany and the west coasts of Ireland, Scotland, and Norway. Those on the east were much less indented in the form of fiords. The same phenomenon might be observed on the coasts of Asia Minor.—An officer attached to the French expeditionary corps in Tongking forwarded a series of extracts from the work of a Spanish missionary, Father Fuentes, who it appears has traversed the country and possesses a good knowledge of it. Unfortunately, however, we are not in possession of the title of this work, which would be very valuable under existing circumstances, nor do we know whether the work (comprising two volumes) is still in manuscript, or has been published. The following, however, are some extracts, together with remarks by the correspondent:—The distance from Bac-Ninh to Lang-son is estimated at six days' march for a man walking on the average seven hours a day, and it takes nine days to reach Cao-bang from Lang-son under the same conditions. On the route from Bac-Ninh to Lang-son a number of streams are passed every day of the march, on an average four or five a day, but on the last day as many as ten. When shallow, these streams can be

forded. Along the road from Lang-son to Cao-bang the same feature is noticed. The stream flowing to the north of Lang-son does not empty itself into the sea as indicated on the map of M. Dutreuil du Rhins, but flows, on the contrary, by the side of Thât-ké. The latter is a place of considerable importance, inhabited principally by Chinese and mountaineers of peaceful disposition. When Father Fuentes visited the locality there were only two Annamite families in the town. From commercial and military points of view, and also in consequence of its sanitary condition, the position of Thât-ké is decidedly superior to that of Lang-son, and is undoubtedly the place at which foreigners should establish themselves. At Cao-bang also very few Annamites are to be found, the inhabitants being of the same class as at Thât-ké. The town is of some importance, and possesses a fort, which is, however, simply under ground. The place is not larger than Quang-gen; the iron and gold (?) mines formerly worked there have been abandoned. M. Gouin's map places Cao-bang on the river Thai-nguyen, but judging of its position from the information given in the extracts from Father Fuentes' work, it would appear that M. Gouin is mistaken. The map of M. Dutreuil du Rhins, on the contrary, seems to be more exact as regards the course of this river, which is represented as only a small narrow stream incapable of floating boats. The respective positions of towns on the map of M. du Rhins are more accurate than on that of M. Gouin, where Cao-bang is placed much too near the Thai-nguyen. At Cao-bang the country is very poorly cultivated. The inhabitants do not eat rice, but consume a great quantity of maize. The forests are broken by rushes and tall grasses. The country abounds in buffaloes, oxen, pigs, ducks, and fowls. The water is bad, the abnormal development of the stomach together with the bloated appearance of the face noticeable in the inhabitants of the district being attributed to their use of this unwholesome water, which for drinking purposes should be carefully boiled or mixed with tea. At Thât-ké, on the contrary, the water is good and the climate reported healthy. The inhabitants have a healthy appearance, and live much longer than those dwelling in the district between Thât-ké and Bac-ninh. Lang-son is also regarded as unhealthy.—It was stated that the Academy of Science had recently appointed a commission charged to proceed to Spain for the purpose of investigating the cause of the earthquakes which had recently taken place in that country. The chief of the commission was M. Fouque, geologist, and a member of the Academy. At the invitation of the Chairman, M. Fouque, who was present at the meeting, gave some details regarding the programme of the proposed investigations of the commission, and also upon the object to be pursued in Spain.—M. A. Thouar announced that he was preparing to start again for a fourth journey in South America. Having ascended the Paraguay and studied the delta of the Pilcomayo river, it was his intention to cross Northern Chaco with the view of establishing a commercial route between Bolivia and Uruguay. He would then pursue his investigations on an almost unknown affluent of the Amazons, the Madre de Dios, and endeavour to find a new route between the provinces north of Bolivia, those of the Peruvian Cuzco, and Europe by means of the Amazons.—After M. Capus had read a part of the diary kept by him during his journey in Central Asia, the General Secretary, speaking of M. Prejevalsky and his present expedition, announced that the indefatigable Russian traveller had just achieved the distinction of being the first among Europeans to visit the sources of the river Yang-tsze-kiang.—In conclusion, Dr. Hamy, head of the Ethnographical Museum of the Trocadero, made a communication on the part taken by French science in American studies, more especially as regards Mexico.

NEW BOOKS.

(By J. SCOTT KELTIE, *Librarian.*)

EUROPE.

Europäische Gradmessung.—Das Schweizerische Dreiecknetz herausgegeben von der Schweizerischen geodätischen Commission. Zweiter Band. Commission von S. Hühr, 1885.

The various items included in the present volume are:—1. A connection established between the new triangulation and the former base lines of Aarberg (Bern), Weinfelden (Zurich), and Bellinzona (Ticino). 2. A valuation of errors and their limits in the mensuration of the angles and the sides of triangles. 3. The connection of the new network of triangles with the points determined by independent observations, namely, Geneva, Neuchâtel, Bern, Zurich, the Weissenstein above Soleure, the stations on the Rigi, the Gæbris, and the Simplon. 4. The connection with the outward signals on foreign territory, the Feldberg in the Black Forest, the castle of Hohentwiel in Swabia, the Hersberg beyond the Lake of Constance, the Pfänder in the Vorarlberg, the Trélod in Savoy, and the Colombier in the French Jura.

The primary triangles are 41 in number, and the primary stations 29, besides minor ones in the neighbourhood of the astronomical observatories.

The heights of some of them are as follows:—The Simplon, 6565 feet; Grieserhorn, 9022; Wasenhorn, 10,722; Schienhorn, 8662; Faulhorn, 9000; Mattwaldhorn, 10,729; Zurich Observatory, 1611; Neuchâtel Observatory, 1608; Berne Observatory, 1860, on 5° 6' 9" long. E. of Paris; Hasenberg, 2575; Baldenburg, 2667; Geneva Observatory, 1342; the Voirons, 4866; the Piton of Salève, south of Geneva, 4524, on 3° 48' 2" long. E. of Paris.

Those stations are not always chosen on account of their absolute height, but for peculiar accidents of direction for the pointing of instruments. Besides a general map of the primary triangulation, there are 31 maps giving the details of the site of some of the stations.—[Paul Chaix.]

Neumann, [Dr.] C., and Partsch, [Dr.] J.—*Physikalische Geographie von Griechenland., mit besondere Rücksicht auf das Alterthum.* Breslau, W. Kölner: 1885, 8vo. and pp. xii. 476.

This is one of those special geographical works that are only possible in a country in which geography is recognised, encouraged, and endowed in the schools and universities as a branch of research on a footing of equality with other branches of science. Dr. Neumann formerly held the chair of geography in Breslau, which is now ably filled by Dr. Partsch. Those familiar with recent German geographical literature will be able to recall not a few works of a class similar to the present. In this country there is no encouragement to the production of such works.

The present work is based on the idea, hitherto very inadequately worked out, that the natural characteristics of a country are an important factor in the development of its civilisation. This, the authors think, was especially the case with those lands which were the scene of what is usually known as ancient history. In earlier antiquity the trade relations of the various peoples were so meagre that the physical conditions of their dwelling-place were predominant. Greece, the authors seek to show in their introduction, possessed the leading conditions for the rapid and many-sided development of a young civilisation:—the necessity and possibility of effort on the part of men to improve their surroundings; multiplicity of forms in surrounding nature; opportunity for active commercial intercourse. The authors then proceed to describe in detail the climate of Greece, pointing out that in antiquity the position of a country was of less importance for its development than at the present day. The heat, moisture, atmospheric pressure and movements in various parts of Greece are considered, and tables given. Chapter II. deals with the leading conditions of land and sea, and Chapter III. enters into details as to the relief of the land in the various divisions of ancient Greece. In Chapter IV. the geology of the country is treated with considerable minuteness; while Chapter V. deals with the vegetation on much the same scale.

ASIA.

Bird, Isabella L.—Unbeaten Tracks in Japan. An account of Travels in the Interior, including visits to the Aborigines of Yezo, and the Shrine of Nikkô. New edition, abridged. London, John Murray: 1885, cr. 8vo., pp. xxiv. and 336, illustrations. Price 7s. 6d.

A new and popular edition of Miss Bird's former work, published in 1880, and noticed in the 'Proceedings' for the same year at p. 780.

AFRICA.

Ellis, A. B.—West African Islands. London, Chapman & Hall: 1885, 8vo., pp. viii. and 352. Price 14s.

Compiled from notes taken, during visits to the principal islands lying off the West Coast of Africa, between the years 1871 and 1882. The islands separately treated of are:—St. Helena, Ascension, Fernando Po, the Isles de Los, St. Vincent, San Antonio, Goree, Grand Canary, Teneriffe, and Madeira. The *Bissagos* Islands, Ilha do Principe, S. Thomé, and Annobon are not referred to.

Thomson, Joseph.—Through Masai Land: a Journey of Exploration among the Snow-clad Volcanic Mountains and Strange Tribes of Eastern Equatorial Africa. Being the Narrative of the Royal Geographical Society's Expedition to Mount Kenia and Lake Victoria Nyanza, 1883-84. By Joseph Thomson, F.R.G.S., Leader of the Expedition. Illustrations and maps. London, Sampson Low & Co.: 1885, pp. xii. and 583. Price 21s.

Those of our readers who were fortunate enough to listen to Mr. Thomson's well-told story at the opening meeting of the Society last November, and those who have only been able to read it in the pages of the 'Proceedings,' will have had their appetites whetted for the abundant and varied feast provided in the handsome volume before us. With regard to the interest and scientific value of the work, we can only echo the chorus of praise with which it has been received by the Press. Mr. Thomson's bright and attractive style is well known to the readers of his previous narrative; his unfailing good-humour, buoyant spirits, keen appreciation of the ludicrous, graphic and glowing descriptions of scenery, and sympathetic portraiture of people, are qualities which in our estimation adorn the solid scientific groundwork of his narrative. The Society intrusted Mr. Thomson with the accomplishment of a briefly but clearly defined mission:—"The ascertaining of a practicable direct route for European travellers west through the Masai country from any of the East African ports to Victoria Nyanza, and to examine Mount Kenia; to gather data for constructing as complete a map as possible in a preliminary survey; and to make all practicable observations regarding the meteorology, geology, natural history, and ethnology of the regions traversed." How conscientiously and completely Mr. Thomson has carried out his mission is known to our readers, and is evident in every page of the volume before us. His trials and sufferings were many and severe. His own men were as bad a lot as ever left the coast; but he brought them back physically and morally regenerated. One less brave or less humane and patient than he might have been tempted over and over again either to flight or violence in the face of the stalwart, warlike, ever irritating Masai. Putrid meat was his food for weeks, and so dysentery laid him low for a couple of months, and nothing but his indomitable spirit and his strong sense of the ludicrous even with death staring him in the face, prevented him from succumbing entirely. Nothing whatever could provoke Mr. Thomson to risk his success in doing what he undertook to do for the Society, which has every reason to be satisfied with its young pioneer.

It is unnecessary here to go over the ground again with which the readers of these pages must be familiar. It would probably be hard to say whether Mr. Thomson has established that a practicable direct route exists from the east coast to Victoria Nyanza through the Masai country. He certainly succeeded, by infinite tact and long-suffering, in making it practicable for

himself and his men ; but we suspect it will take some time before the Masai can be persuaded to permit a regular route to be opened through their country. Doubtless it will be easier for Mr. Thomson's successors than it was for himself, if they are endowed with a fair share of his tact. So far as is known he is the first white man that has succeeded in penetrating Masai-land. Rebmann, Krapf, New, Wakefield, and Von der Decken succeeded in reaching the border of the region which Mr. Thomson has explored, and Kilima-njaro, even before Mr. Johnston's visit, had been ascended to the snow-line. Krapf, we know, got as far north as Ketui, and even reached the Tana, but that was far east of Mr. Thomson's route, and out of the country of the Masai altogether. It was then he got a glimpse of snowy Kenia, though Mr. Thomson shows that he made a curious mistake as to its direction and configuration. Wakefield indeed, as will be seen from Ravenstein's map, collected much information as to routes and features from native travellers, and some of this information Mr. Thomson has proved to be wonderfully correct. But it was always recognised as dangerous by caravans to traverse the Masai country, and these never returned without leaving not a few of their numbers behind them. Dr. Fischer, just previous to Mr. Thomson, had to beat a precipitate retreat when only half-way between Kilima-njaro and Lake Baringo. The country is likely to be sought after by hunters of big game, for probably no region on the continent, Mr. Thomson shows, is richer in this respect. Some parts of the route were certainly desert and waterless enough. There are two such stretches between the coast and Kilima-njaro, and at least one great waterless desert between Kilima-njaro and Lake Naivasha. Much of the region, however, especially in the north, about the Aberdare range, is rich in rivers, beautiful and romantic in aspect, bracing and healthy, and abounding in splendid pasture. Events are moving so rapidly in Africa that ere very long we may expect to find this magnificent country—guarded north and south by its alpine peaks, with some of the finest features of its explorer's native land between, becoming the sanatorium and tourist resort of the budding states of Central Africa.

From the geographical point of view, Mr. Thomson's chief task was to gather data for constructing as complete a map as possible in a preliminary survey. How very thoroughly, under the most trying circumstances, he carried out the duty is evident both from his book and his map. Compare the latter with the section of Mr. Ravenstein's map which includes this region, and it will at once be seen how materially the Society's latest expedition has contributed to a knowledge of African geography. At the same time it will become evident that the data collected by Wakefield and others from the native traders who had ventured into those parts, are fairly accurate. But when Mr. Ravenstein revises the sheet he will have much work to do to bring it up to date. True, with Mr. Thomson as with other pioneer explorers, only the general features along his route and for a little distance on each side could be roughly mapped ; still his map is wonderfully precise. Of course we are here on the central tableland, but in this particular region that tableland is strongly accentuated. On the north especially, we have some fine ranges of mountains, marked by the loveliest valleys and glens. Broken groups of hills, rising into many peaks, are found along the whole route. On the west a steep escarpment runs nearly the whole distance, and in the further north a few peaks that almost rival Kilima-njaro and Kenia themselves. Great forest regions and grassy plains, beautiful lakes, fine waterfalls, rapid rivers, gleaming lakelets, are some of the features which render this remarkable region attractive. But Mr. Thomson is more than a topographer. As we know, geology is his speciality, and he knows how to observe intelligently both in zoology and botany. To the geologist the country is one of the highest interest. Much of it is evidently in the last stage of volcanic activity. The centre of the region, it may be said, belongs either to the earlier or later volcanic series, and is marked by a great plain of depression. Both Kilima-njaro and Kenia belong to the later volcanic series, and both show that in no very remote period they must have been the scenes of stupendous activity. Indeed Kenia does not seem quite cooled down yet, and the people of Chaga have a tradition that the crater lake of Chaga occupies the site of a former town. Broad belts of metamorphic rocks flank the central area on each side, while on the east, between the metamorphic and the lowest tertiaries is a wide strip of

carboniferous. Of course these indications must be regarded as of the most general character, and to a large extent conjectural; at the same time it should be remembered that Mr. Thomson knows how to read the rocks. In some respects the zoology and botany are as wonderful as the scenery.

No region in Africa, probably, so abounds in game; and Mr. Thomson's sporting adventures add excitement to his narrative, and are sure to draw mighty hunters to this region. In some respects the botany is very remarkable; at one time recalling the vegetation of the Cape and at another reminding Mr. Thomson of the pine forests and heath-clad mountains of bonny Scotland. But what interested the explorer most were the Masai themselves. Magnificent savages they seem to be from his account, unlike any African people he has seen or heard of. That they have close affinities with the Gallas there seems little doubt; their own traditions indicate that they are migrants from Galla-land into their present home, where they have had much hard fighting to maintain their place. Still they are evidently mixed to some extent with other tribes of different types from the Gallas; for here we are at the meeting-place of the three great stocks into which the bulk of the natives of Africa are divided. For the many interesting details as to the fine physique, fighting qualities, curious social organisation, customs, dress, and occupations of the Masai we must refer the reader to the book itself. They are in brief cattle-stealers and cattle-rearers, the unmarried men as a rule taking the former rôle and the Benedicks the latter. Mr. Thomson frequently (perhaps too often) alludes to the strange part which expectoration plays in Masai intercourse. Mr. Thomson's powers in this respect were often greatly tried when he wanted to be particularly gracious, and he was occasionally compelled to resort to the custom which prevails in some parts of New Guinea. There, a recent Dutch traveller tells us, it is the custom to welcome a friendly stranger by squirting upon him a shower of water from the mouth. Is it not also the custom in certain parts of Africa for courtiers to preserve the salival discharge from the chief's mouth? No doubt the Masai custom is a survival from a custom which had some sort of rational origin and which it would be of some interest to trace.

It will be evident from these few notes that Mr. Thomson has a completely satisfactory account to render of the manner in which he has performed the mission intrusted to him by the Society—more than was expected of him—and will doubtless be honoured as he deserves. Notwithstanding the unsatisfactory condition of his health, as a result of his Masai-land exploration, he has accepted and is actually employed on a mission of great commercial as well as geographical importance in West Africa; and we trust that in the future his exceptional faculty for successful work in Africa will find satisfactory occupation. We ought to say that his book abounds in instructive, attractive, and well-executed illustrations.

AMERICA.

Weise, Arthur James.—*The Discoveries of America to the year 1525.* London, Richard Bentley and Son: 1884, 8vo., pp. xii. and 380, plates and maps. Price 15s.

This work contains a summary of the various statements of historical writers concerning the voyages of the persons whom they believed to have been the discoverers of certain parts of the coast of America between Baffin's Bay and Tierra del Fuego, numerous extracts from old and rare books being given either in the language of the writers, or in faithful translations, so that the intended significance of the information can be perceived, and impartial conclusions formed. The bulk of the volume is marked by laborious research and discriminating criticism, but the first chapter, which deals with pre-historic times, including the early voyages of the Northmen, is likely to find scant favour with classical scholars, as the author boldly propounds, as an accepted truth, the theory that the circumstantial account of Atlantis given by Plato in his "Critias" was founded on genuine historical tradition. He gives a literal translation of a large part of the "Critias," which he seems to find no difficulty in accepting as history, and he is evidently disposed to see in the account of the peopling of the continent by the descendants of Cleito and Poseidon, an actual tradition of the unions between the sons of God and the daughters of

men as related in Genesis. Considering the startling apparent confirmation which Plato's description of the lost Atlantic island received from the discoveries of the Spaniards, and from the wonderful vestiges of an antique American civilisation which yet remain, it is not surprising that some persons should have been led to the conclusion that the philosopher actually had the authority of Egyptian tradition for his remarkable statements. Such speculations, however, are rather out of place in the work of a sober-minded historian. With regard to the Sagas, Mr. Weise is not so easily satisfied, and he considers that no geographical information contained in them verifies the assertion that the Northmen discovered America, and explored the coast of a part of the present territory of the United States. He agrees with Mr. Haliburton * that the site of Vinland the Good is nearer Greenland than Rhode Island, and is of opinion that "as there is no reliable information to indicate that the Northmen of the tenth century had any instruments by which they could accurately measure the changing spaces of day and night, or that their observations of the sun gave them the knowledge of astronomical time, an attempt to elucidate the exact duration of the shortest day in Vinland from the vague signification of the words *eyktar-stad* and *dagmála-stad* would consequently be futile and unsatisfactory."

The second chapter embraces the period between 1295 and 1487, including an outline of the story of Marco Polo, and a sketch of the life of Prince Henry of Portugal, and the remainder of the volume is devoted to the achievements of Columbus, and the numerous voyages of discovery to which they gave rise; but as this is all more or less solid ground, it is only necessary to add that Mr. Weise has succeeded in bringing together a large amount of useful information, some of it not easily accessible elsewhere, and as it is enriched by copious foot-notes, the whole may be regarded either as a valuable work of reference, or an introduction to more extended study.

Besides "a representation of the astrolabe found in 1867 in the county of North Renfrew, province of Ontario, Canada, supposed to have been lost by Champlain on his way to Ottawa in 1613," and two small charts showing the field of voyages to America, the text is illustrated by the following twelve copies of rare maps, viz.—I. Delineation of the Hyperborean Regions by Sigurd Stephanus in 1570. II. A part of the map of the New World contained in the edition of Ptolemy's Geography printed in Strasburg in 1513. III. A part of the Cabot-map of 1544 in the Bibliothèque Nationale, Paris. IV. Map of the New World contained in Peter Martyr's "*Legatio Babylonica*," printed in 1511. V. A tracing representing the limits of the discoveries of Juan Ponce de Leon and Francisco de Garay, 1521. VI. A part of the map of the fourth part of the world contained in the *Cosmographie Universelle* by André Thevet, printed in Paris in 1575. VII. Map of *Terre de la Franciscane* in the *Cosmography* of Jean Alphonse and Raulin Secalart, 1545. VIII. Map of a part of North America made by Giacomo de Gastaldi in 1553. IX. A part of the map of the world made by Gerard Mercator in Duisburg in 1569. X. A part of the map of the world made by Juan de la Cosa in 1500 (cover-pocket). XI. A part of the map of the world made by Johann Ruysch, contained in the edition of Ptolemy's Geography printed in Rome in 1508 (cover-pocket). XII. A part of the map of the world made by Visconte de Maiollo in 1527 (cover-pocket).

ARCTIC.

Melville, George W.—In the Lena Delta. A Narrative of the Search for Lieutenant De Long and his companions, followed by an Account of the Greeley Relief Expedition, and a proposed method of reaching the North Pole. Edited by Melville Philips. London, Longmans, Green, & Co.: 1885, 8vo., pp. xiii. and 497, maps and illustrations. Price 14s.

The first four chapters of this book are devoted to the voyage and drift of the *Jeannette*, and the retreat of her crew, up to the separation of the three boats

* See 'A Search in British North America for Lost Colonies of Northmen and Portuguese,' *ante*, pp. 25-32.

in the fatal gale of September 12, 1881, and the next twenty-four contain a popular account of the landing of the whaleboat and the subsequent searches for the crews of the first and second cutters, the official account of which was noticed in our 'Proceedings' for April 1883, p. 241. The present work, therefore, calls for no special mention, beyond observing that the detailed account given of the exploits in the Lena Delta in which Chief-Engineer Melville was the prime mover and central figure, enable us to realise more fully than ever the nature of his heroic efforts, and clearly shows that he did all that a brave and steadfast man could do to find and rescue his missing shipmates.

Undaunted by his previous Arctic experiences, Mr. Melville sailed again last May in the *Thetis* to the relief of Lieutenant Greely, and a brief sketch of the object and results of the Lady Franklin Bay Expedition, and of the measures which led to the rescue of the leader and five members of his party, is given as forming "an appropriate epilogue to the tragic tale of the *Jeannette*." The details which have already appeared in American newspapers regarding this expedition, as well as the paper read by Lieutenant Greely himself at the Montreal meeting of the British Association, have also been noticed in our 'Proceedings,' vol. vi., pp. 465, 537, 679, &c., and as the official account may be shortly expected, it would be superfluous to discuss the particulars now given by Mr. Melville.

The concluding chapter of the volume contains the author's proposed method for reaching the North Pole by the Franz-Josef Land route, which he is anxious to test personally; and the Appendix includes a description of the Melville sledge, and some notes on the equipment and provisioning of Arctic expeditions, with illustrations.

The book is illustrated by a portrait of the author, and numerous wood engravings, and a chart of the Lena Delta shows all the localities mentioned in the text, as well as the routes taken by De Long and Melville after landing, and the routes of the search parties. There is also a map showing the course and drift of the *Jeannette* from the *Vega's* winter quarters to the position where she went down, and the subsequent route of her crew over the ice; also a map of the channels north of Baffin's Bay showing the line of Lieutenant Greely's retreat from Lady Franklin Bay, the *Neptune's* highest point in 1882, &c., and a circumpolar map showing Mr. Melville's proposed route to the Pole, the probable drift of the *Jeannette* if she had not sunk, and the highest points reached by different navigators.

Nordenskjöld, Adolf Erik [Freiherr von].—Studien und Forschungen veranlasst durch meine Reisen im hohen Norden. Herausgegeben von Adolf Erik Freiherrn von Nordenskjöld. Ein populär-wissenschaftliches Supplement zu Die Umseglung Asiens und Europas auf der *Vega*. Autorisirte Deutsche Ausgabe. Mit über 200 Abbildungen, 8 Tafeln und Karten. Leipzig, Brockhaus; London, Dulau: 1885, 8vo., pp. ix. and 521.

The seven memoirs which make up this volume were originally intended to form part of Baron Nordenskjöld's account of his circumnavigation of Europe and Asia in the *Vega*. It will be remembered that in that work the Baron introduced several special chapters of much scientific value, on the progress of exploration in the seas north of Europe and Asia, on the Arctic fauna, and other subjects; and he has been well-advised to publish the present volume as a separate work, though supplementary to the previous one. We believe that several of these papers have, at least in part, appeared in the Transactions of the Swedish Academy, and been abstracted in English scientific journals. The first of the memoirs will probably be already familiar to our readers; it is by Baron Nordenskjöld himself, dealing with the voyages of the brothers Zeni, and was noticed in its original Swedish form in the 'Proceedings,' 1883, p. 372. The second paper, by Professor Wittrock, is on Snow and Ice Flora, with special reference to the Arctic regions, with an appendix on Snow and Ice Fauna. The third paper, by Baron Nordenskjöld himself, deals in considerable detail with his hypothesis, which has been so much criticised, as to the fall of cosmical matter on the earth, with special reference to the Kant-Laplace theory. The Baron aims to prove, from the results of his own observations and those of other

geologists, from a comparison of the mineralogical and chemical composition of rocks, and other data, that besides the myriads of meteors that have fallen upon the surface of our globe, a continuous dust-cloud is depositing its contents to an appreciable thickness annually. Hence, he contends that at least a large part of the volume of the earth is of meteoric origin. Whatever may be thought of the value of the theory, the wealth of data adduced by the writer, and the interesting maps and illustrations form a valuable contribution to geological and geographical science. The next paper is by Dr. Nathorst, and points out in detail the contributions made by Arctic exploration to a knowledge of the botanical geography of early geological times. Dr. Hans Hildebrand devotes nearly 100 pages to a memoir of much ethnological interest on the knowledge of art possessed by uncivilised peoples. Here the researches of the *Vega* staff among the Chukches during their year's detention on the Siberian coast, prove of great service. Some of the artistic efforts of this interesting people have already been given in the 'Voyage of the Vega.' Next Dr. Christopher Aurivillius devotes about fifty pages to the Insect Life of Arctic lands; while the concluding paper, of about eighty pages, by Dr. Kjellman, deals in the same way with Arctic Plant Life. The many woodcuts, coloured plates and maps, add greatly to the scientific value of this varied volume.

AUSTRALASIA.

[*Australia.*—The Australian Handbook (incorporating New Zealand, Fiji, and New Guinea) and Shippers' and Importers' Directory for 1885. London, Gordon & Gotch: 8vo., pp. 728. Price 10s. 6d.

This useful publication reaches its sixteenth annual issue with the present volume. It contains a vast amount of information, up to date, relative to the Australasian Colonies, including the Discovery, Settlement, Geography, Climate, Products and Resources, and Statistics of each. It also contains an account of the Colony of Fiji and of New Guinea; as also a Gazetteer of the principal towns in Australia and New Zealand, &c. The work is profusely illustrated with maps which have been enlarged and prepared from the best sources.

GENERAL.

[*'Challenger.'*—Report on the Scientific Results of the Voyage of H.M.S. *Challenger* during the years 1873–76, under the command of Captain George S. Nares, R.N., F.R.S., and Captain Frank Tourle Thomson, R.N. Prepared under the superintendence of the late Sir C. Wyville Thomson, Knt., F.R.S., &c., and now of John Murray. Zoology, vols. x. and xi. London, Longmans & Co., &c.: 1884, 4to., pp. (vol. x.) viii., 154, 82, 47, 130, xxiv., and 216, chart and plates; (vol. xi.) viii., 88, x., 442, and 85, plates. Price respectively, 50s.

The previous volumes of the series are noticed in the preceding volume of the 'Proceedings' at pp. 485 and 610.

Vol. x. contains:—i. Report on the Nudibranchiata collected by H.M.S. *Challenger* during the years 1873–76, by Dr. Rudolph Bergh. ii. Report on the Myzostomida collected during the same period, by Dr. L. von Graff. iii. Report on the Cirripedia collected by H.M.S. *Challenger*, ditto; anatomical part by Dr. P. P. C. Hoek. iv. Report on the Human Skeletons collected during ditto. The Crania, by William Turner, M.B., &c. v. Report on the Polyzoa collected by H.M.S. *Challenger*, during ditto. The Cheilostomata. By George Bursk, F.R.S., &c.

Vol. xi. contains:—i. Report on the Keratosa collected by H.M.S. *Challenger*, during ditto, by N. Poléjaeff, M.A. ii. Report on the Crinoidea collected during ditto. The Stalked Crinoids. By P. Herbert Carpenter, D.Sc. iii. Report on the Isopoda collected by H.M.S. *Challenger*, ditto. The Genus *Serolis*. By Frank Evers Beddard, M.A., &c.

NEW MAPS.

the Scottish Geographical Magazine. Edinburgh, Macnamara & Wallace.
Philip & Son.

We welcome the first number of the organ of the Scottish Geographical Society. It covers a period of three months, and as its purview embraces to some extent the past year, it is exceedingly full and varied. The number begins, of course, with Mr. Stanley's opening address on Central Africa and the Congo Basin. Then follow two papers with a distinctly local flavour: one on Scotland and geographical work, showing what Scotchmen have done in the various departments of our branch of knowledge; the other is a paper of original value by Professor James Geikie on the Physical Features of Scotland; both the paper and the accompanying map deserve the attention of geographers and geologists. We have then short notices of the first honorary members of the Society, the King of the Belgians, Lord Aberdare, Mr. Stanley, and Mr. Joseph Thomson. The most useful feature of the magazine is the Geographical Notes, which are of the most varied kind; they occupy fifteen pages. Five pages are devoted to the geographical literature of 1884, and about twelve pages to new books and new maps. Besides the map of Scotland, there is a map of Africa, both by Bartholomew.

Wagner, Hermann.—Geographisches Jahrbuch. X. Band, 1884. Erste Hälfte. Unter Mitwirkung von O. Drude, G. Gerland, J. Hann, Th. V. Oppolzer, L. K. Schmarda, K. Zöppritz, herausgegeben von Hermann Wagner. Gotha, Justus Perthes: 1885. Price, two parts, 12s.

Since the last issue of this invaluable publication, its founder and joint editor, Dr. Behm, has died. With the present volume the work enters on a new phase. This is really only a half-volume, the other half being promised in the course of the present year. Henceforth it will be issued annually, the first and second parts in alternate years. In the present part we have the special division, which includes reports of progress in the various departments of science which bear on geography. Professor Zöppritz deals with Geophysics, Dr. Hann with Meteorology, Dr. Oppolzer with European Survey Operations, Dr. O. Drude with Botanical Geography, Dr. Schmarda with the Geographical Distribution of Animals, and Dr. Gerland with Ethnological Research.

NEW MAPS.

(By J. COLES, *Map Curator R.G.S.*)

EUROPE.

France.—Carte de—, dressée par le Service Vicinal par ordre de M. le Ministre de l'Intérieur. Scale 1:100,000 or 1'3" geographical miles to an inch. Paris 1884. Sheets:—IX. 25. Ile d'Oléron. XIII. 10. Yvetot. XIII. 12. Berna. XIV. 9. Dieppe. XIV. 13. Conches. XV. 16. Bonneval. XVI. 18. La Fer. St. Aubin. XXI. 15. Brienne. XXI. 17. Châtillon-sur-Seine. XXIII. XXV. 13. Château-Salins. XXV. 15. Baccarat. XXV. 18. Montbéli. XXV. 19. Baume-les-Dames. XXVI. 15. St. Dié. XXVI. 18. Belfort. of each sheet 7d. (*Dulaud.*)

— Carte de— en quatre-vingt-six départements indiquant les chemins des routes avec les distances en kilomètres, les nouvelles divisions militaires Paris, Garnier Frères. (*Dulaud.*)

London.—Philips' Redistribution Map of——. Showing all the New Boroughs, with the number of their Representatives, as proposed by the Seats Bill, 1884; Statistics of Population in 1871 and 1881, Acreage and Inhabited Houses in each Borough. Scale 1:125,000 or 1·7 geographical miles to an inch. George Philip & Son, London. Price, mounted on cloth and in case, 6s.

Schlesien und der Grafsch. Glatz.—Special-Karte von——. Scale 1:300,000 or 4·1 geographical miles to an inch. Neue Ausgabe von Dr. Sadebeck. Breslau, Korn. 4 sheets. Price 11s. (*Dulau.*)

Schweiz.—Dritte Karte der——, von J. M. Ziegler. Scale 1:380,000 or 5·2 geographical miles to an inch. Wurster & Co., Zurich. Edition of 1885. Price 10s. (*Dulau.*)

Surrey.—Philips' New Map of ——, from the Ordnance Survey. By J. Bartholomew, F.R.G.S. Scale 1:63,360 or 0·86 geographical miles to an inch. George Philip & Son, London and Liverpool. Price 15s., mounted, and folded in case.

ASIA.

Russo-Afghan Boundary Question.—W. & A. K. Johnston's Special Map to elucidate the——. Scale 1:3,550,000 or 48·6 geographical miles to an inch. With an inset map showing the encroachments of Russia from the accession of Peter the Great in 1689 to the present time. W. & A. K. Johnston, Edinburgh and London, 1885.

At the present time, when the Anglo-Russian Commission are about to survey a mutual boundary line, this map is likely to be of great use in following the movements on the Afghan frontier. A glance at the inset map will show the continued advance of Russia towards India during the past four centuries, and the extension of the railway system in the same direction, which at the present time has reached Orenburg in the north, and beyond Kizil Arvat, in Turkistan, in the south. A small inset map is also given, showing British possessions in Asia, Africa, and Australasia, with the distances between them.

AFRICA.

Africa.—General Map of——. Scale 1:8,420,000 or 115·2 geographical miles to an inch. Constructed from the most recent coast surveys, and embodying the results of all explorations to the present time, by Keith Johnston, F.R.G.S. Corrected to January 1885. W. & A. K. Johnston, Edinburgh and London. 4 sheets. Price in sheets 15s.

Algérie.—Carte de l'——, d'après les documents publiés par le Ministre de la Guerre et des travaux inédits par Niox. Scale 1:1,600,000 or 21·9 geographical miles to an inch. Paris, 1885. (*Dulau.*)

Assab.—Carta Originale del Possedimento Italiano di—— del Sultanato di Aussa e regioni limitrofe dall' Abissinia e Scioa a Berbera e Aden. Con speciali cartine di Assab e dintorni, dei Paesi dei Danakil, della Baia di Zula e del Mar Rosso, secondo le pubblicazioni più recenti cost. e dis. G. E. Fritzsche. Scale 1:1,500,000 or 20·4 geographical miles to an inch. Istituto Cartografico Italiano, Roma, 1885. (*Dulau.*)

Congo.—Carte du Bassin du Congo dressé par le Dr. Richard Kiepert. Scale 1:4,000,000 or 55·5 geographical miles to an inch. Avec la limite de la zone de commerce libre, établie par la conférence de Berlin, les possessions de puissances Européennes et les itinéraires principaux de voyageurs. Dietrich Reimer, 1885. Price 2s. (*Williams & Norgate.*)

On this map is shown the extent of the region of Free Trade as fixed by the Conference of Berlin. This includes, as far as the southern boundary is concerned, No. IV.—APRIL 1885.]

NEW MAPS.

more than the basin of the Congo, inasmuch as the boundary line starts from Ambriz on the coast, and follows the river Logé to its source. In the north it starts from Sette Cama in a general easterly direction, touching the parallel of 2° south close to the source of the river Louté; here it turns to the south-east for a distance of 90 geographical miles and then abruptly to the north; it thus includes the basin of the Niari river. The boundaries of European possessions and native states, as well as the routes of the celebrated travellers of all nations, are laid down.

Egypt and the Basin of the Nile, constructed by W. & A. K. Johnston. Edinburgh and London. Scale 1 : 3,294,720 or 45·1 geographical miles to an inch. 2 sheets. 1885.

— **and the Soudan**.—Philips' Map of—, including the Valley of the Nile, the Red Sea, Abyssinia, Arabia, &c. Scale 1 : 5,600,000 or 78·7 geographical miles to an inch. George Philip & Son, London and Liverpool. Price 1s.

Gordon, General C. G., R.E.—Facsimile of a map drawn by General C. G. Gordon, R.E., at Khartum, March 17th, 1874, of his route from Suakin to Berber and Khartum. Scale 1 : 1,325,000 or 18·2 geographical miles to an inch (approx.). Reproduced in facsimile, and published by Edward Stanford, 55, Charing Cross, London, S.W. February 17th, 1885.

This map is not only interesting as a souvenir of the late General C. G. Gordon, R.E., but also contains information as to the distances between stations on the road between Suakin and Berber, expressed in hours, and other notes of great interest at the present time. The reproduction from the original has been very well executed.

Soudan.—Large Scale War Map of the Eastern—, embracing Dongola, Suakin, Berber, Khartoum, and Kassala. Scale 1 : 1,140,000 or 14·2 geographical miles to an inch. With view and plan of Khartum and Suakin. W. & A. K. Johnston, Edinburgh and London, 1885. Price 1s.

South African Republic.—Map of the South-Western Frontier of the—, including the adjacent portions of Bechuanaland, Griqualand West, and the Orange Free State, 1884. Scale 1 : 633,600 or 8·6 geographical miles to an inch. Compiled and lithographed at the Intelligence Branch, War Office, under the direction of Major W. R. Fox, R.A., D.A.Q.M.G., November 1884. Revised March 1885.

Suakin & Berber.—Da—. Scale 1 : 1,000,000 or 13·6 geographical miles to an inch. Constr. e autogr. G. E. Fritzsche. Istituto Cartografico Italiano, Roma, 1885. (*Dulau.*)

Sudan Egiziano.—Carta Generale del—, colle Coste del Mar Rosso da Suakin fino ad Assab. Sulla base dei nuovi dati geodetici dello Stato Maggiore Egiziano: e coll'indicazione degli itinerari dei principali viaggiatori fino a G. Bianchi 1884. Constr. e dis. G. E. Fritzsche. Scale 1 : 2,500,000 or 34·4 geographical miles to an inch. Istituto Cartografico Italiano, Roma, 1885. (*Dulau.*)

Zulu-Land.—Kartenskizze von — und den Goldfeldern der Südafrikanischen Republik. Nach C. Manch, F. Jeppe, Sir G. Colley, Rev. Berthoud, Capt. Riedel, H. Rissik, R. Loveday, Major Machado &c. sowie nach eigenen Aufnahmen gezeichnet von H. Haevernick. Pretoria, 1884. Scale 1 : 1,850,000 or 25·3 geographical miles to an inch. Petermann's 'Geographische Mittheilungen,' Jahrgang 1885, Tafel 6. Justus Perthes, Gotha, 1885. (*Dulau.*)

AMERICA.

Florida.—Rand, M'Nally & Co.'s New Sectional Map of——. Scale 1 : 633,600 or 8·6 geographical miles to an inch. Rand, M'Nally & Co., Chicago, 1885. (*Dulau.*)

This is one of Rand, M'Nally & Co.'s useful series of maps.

Nord Amerikas.—Übersichtskarte über die Endmoräne der Zweiten Glacial-epoche——. Nach T. C. Chamberlin, 1882. Scale 1 : 15,000,000 or 205·4 geographical miles to an inch.; Petermann's 'Geographische Mitteilungen Jahrgang 1885, Tafel 5. Justus Perthes, Gotha. (*Dulau.*)

CHARTS.

Admiralty.—Charts and Plans published by the Hydrographic Department, Admiralty, in November and December 1884, and January and February 1885.

No.	Inches.	
2675 <i>abc</i> m	= 0·18	English channel, 3 sheets. Price 3 <i>s.</i> each.
2045 m	= 1·35	England, south coast:—Owers to Christchurch, with Spithead and the Isle of Wight. Price 4 <i>s.</i> 6 <i>d.</i>
606 m	= 3·0	Shetland isles:—Ronas Voe. Quendale bay. Vaila sound. Uyea and Skuda sounds. Ura firth or Hillswick. Blue Mull sound. Leven and Sand Wicks. Price 1 <i>s.</i> 6 <i>d.</i>
1130 m	= 2·9	Mediterranean, Sicily:—Cagliari bay. Price 1 <i>s.</i> 6 <i>d.</i>
236 m	= 0·21	Mediterranean, Turkey in Asia:—Rhodes island to Kara Burnu. (Plans, Castelorizo. Kakava roadstead and entrance into Kakava roadstead. Yali bay. Port Genovese. Tekrova. Adalia. Laara. Eski Adalia.) Price 2 <i>s.</i> 6 <i>d.</i>
237 m	= 0·21	Mediterranean, Turkey in Asia:—Kara Burnu to Karadash Burnu. (Plans, Ptolemais. Alaya. Hamaxia. Silinti. Cape Anamur. Port Melania. Port Chelindreh. Papadula islands. Cavalaière. Provençal or Manaval island. Aghaliman ports. Korghos-Kalaler. Ayash. Mezetlu.) Price 2 <i>s.</i> 6 <i>d.</i>
47 m	= 2·0	India, west coast:—Bet harbour. Price 1 <i>s.</i> 6 <i>d.</i>
2621 m	= 2·0	India, west coast:—Bombay harbour. Price 3 <i>s.</i>
655 m	= 5·0	India, west coast:—Port of Bombay. Price 1 <i>s.</i>
869 m	= 4·7	Tasmania, east coast:—Spring bay and adjacent anchorages. Price 1 <i>s.</i> 6 <i>d.</i>
2306		Plan added. Approaches to Kristiansund.
2647		Plan added. St. Gilles sur Vie.
1335		Plan added. Lobos de Afuera.
253 <i>b</i>		Plan added. Berberch.
911		Plan added. Kaibobo road. Nalahia bay. Tehorn anchorage. Kisalaut bay. Inner harbour.
210		New plan. Odzuchi harbour.
2432		New plan. Anchorages of the west coast of Kazakavitch island.
2532		Plan added. Waikouaiti bay.
1114		Plans added. Hanfield inlet. Camp cove.

(*J. D. Potter, agent.*)

CHARTS CANCELLED.

No.		Cancelled by	No.
887	English, Crooked, Long, and Sea reaches	New chart, English, Crooked, Long, and Sea reaches	887
1128	Ports Conte and Alghero	New plans, Ports Conte and Alghero, Port Torres	1128
1258	Approaches to Séoul	New chart, Approaches to Séoul	1258
1181	Lynmouth, Porlock, Minehead, Watchet	New plans, Lynmouth, Porlock, Minehead, Watchet	1181
1810	Masangzani bay to Primeira islands	New chart, River Zambesi to Mozambique harbour	1810
651	Primeira islands to Mozambique		
1458	Plans on east coast of Spain ..	New plans, ports and anchorages on east coast of Spain	1458
214	Plan of Blanche harbour on this chart	New plan on	656
2458	Gravesend to the Nore.		
2675a, b, c	English channel, 3 sheets ..	New charts, English channel, 3 sheets	2675a, b, c
2045	Owers to Christchurch	New chart, Owers to Christchurch	2045
1130	Cagliari bay	New plan, Cagliari bay	1130
236	Makry to cape Khelidonia		
237	Cape Khelidonia to cape Kara Burnu	New chart, Rhodes island to Kara Burnu	236
238	Cape Kara-Burnu to cape Anamur		
239	Cape Anamur to Lissan el Kahbeh	New chart, Kara Burnu to Kara-dash Burnu	237
240	Lissan el Kahbeh to Kara-dash ..		
675	Port Berberch	New plan, Berberch .. on chart	253b
47	Bate harbour	New plan, Bet harbour	47
2621	Bombay harbour	New plan, Bombay harbour ..	2621
821	Plan of Akysab on this chart.		

CHARTS THAT HAVE RECEIVED IMPORTANT CORRECTIONS.

No. 557. South America:—Harbours and anchorages in Magellan strait. 134. South Pacific Ocean:—Harbours and anchorages in New Hebrides islands. 190. Mediterranean, Sicily:—Girgenti, Catania. 2421. South Pacific Ocean:—Tonga or Friendly islands. 30. England, south coast:—Plymouth sound and Hamoaze. 253a. Africa, north-east coast:—Jibul Jarne to Sayara. 357. Japan:—Harbours in Kü channel. 875. China:—Ports and anchorages in Tong King gulf. 1626. England, east coast:—Blyth. 8c. Red sea:—sheet 3. 1862. Africa, west coast:—Jaboo to Forcados river. 1908. North America, west coast:—Plans on west coast of Lower California. 1753. Ireland, east coast:—Belfast lough. 2361. Sweden, east coast:—Öland to Landsort. 1875. North sea:—Elbe, Weser, and Jade rivers. 780. Pacific Ocean:—S.W. sheet. 8d. Red sea:—Sheet 4. 977. Pacific, Caroline islands:—Harbours and anchorages in Ualan Islands. 1719. Mediterranean:—Ports and anchorages on the west coast of Italy. 81. Red sea:—Mersa Durúr to Trinkitat. 2062. China:—Tong King gulf. 298. Newfoundland:—St. John's harbour. 358. Japan:—Western coasts of Kiüsiu and Nipon. 941a. Eastern archipelago:—Western portion. 942a. Eastern archipelago:—Eastern portion. 641. Africa, south coast:—Port Elizabeth. 1630. England, east coast:—Orfordness to Cremer. 2149. Eastern archipelago:—Gaspar and Banka straits. 2041. Malay peninsula:—Singapore to Timooan island. 2263. Baltic sea:—Riga gulf entrance. 125. North sea:—Ostende roads. 2247.

Baltic sea :—Hogland to Seskar, north shore. 2842a. Baltic sea :—Western sheet. 1189. Mediterranean :—Bonifacio strait. 161a, b. Sardinia island, 2 sheets. 2207. Black sea :—Mouths of Danube river. 2505. Black sea :—Danube river :—St. George's mouth. 274. North Polar chart :—Atlantic side. 278. North Polar chart :—Pacific side. 2563. North America, east coast :—Delaware river, sheet 1. 2039. South America, east coast :—Parana and Uruguay rivers. 821. Bay of Bengal :—Elephant point to Cheduba strait. 842. Bay of Bengal :—Sayer island and adjacent coast to Lankawi island. 1845. Bay of Bengal :—Entrance to Maulmain river. 793a. Malacca strait :—Pulo Penang to Parcelor hill. 2597. Eastern Archipelago :—Banka strait. 2757. Eastern archipelago :—Banka strait to Singapore. 1262. China : Hong Kong to gulf of Lian-tung. 2347. Japan :—Nipon, Kiusiu, and Sikok islands. 2672. Japan :—Hakodate harbour. 475. Australia :—North-west coast of Australia between the parallels of 10° 8' and 21° south. 2354. Australia, east coast :—Cape Grenville to Booby island. 1750. Australia, south coast :—Port Adelaide. 1896. New Zealand :—Auckland harbour entrances. 1970. New Zealand, north island :—Auckland harbour. 2126. New Guinea :—Port Moresby and Fairfax harbour. 936a. New Caledonia :—North-west part. (*J. D. Potter, agent.*)

Dépôt des Cartes et Plans de la Marine.—No. 3985. Carte Particulière des Côtes de France. Embouchure de la Seine. 1884.—No. 3939. Côte Occidentale de France. Cours de la Loire de l'Île Massereau à Nantes. 1882. (Feuille I.)—No. 3940. Côte Occidentale de France. Cours de la Loire de Paimbœuf à l'Île Massereau. 1883. (Feuille II.)—No. 3941. Côte Occidentale de France. Cours de la Loire de St. Nazaire à Paimbœuf. 1883. (Feuille III.)—No. 3979. Mer de Chine. Golfe du Tonquin. Chencaux Intérieurs entre Pak-ha-Moun et Thieng-Moun. 1883.—No. 3993. Mer de Chine. Golfe du Tonquin. Chencaux et Mouillages entre la Cac-Ba et la Baie de Ha-Long. 1884.—No. 4007. Golfe du Tonkin. Passe de l'Aspic donnant accès dans la Grande Baie de Fai-Tsi-Long. 1884.—No. 3971. Tunisie. Lac de Bizerte. Partie Sud. 1883.—No. 4006. Côte Ouest d'Afrique. Guinée. Anse du Petit Beribi ou Half Beriby. 1884.—No. 3903. Terre Neuve. Côte Est. Partie Sud de Belle-Île. 1883.—No. 4003. Canaux Latéraux de la Patagonie. Golfe de Peñas. Île Wager. Port Ballenas. 1884.—No. 4002. Nouvelle Calédonie. Îles Pott et Art. 1884.—No. 3990. Océan Pacifique. Tahiti. Côte Sud de la presqu'île de Tairapu de la Rivière Vavü à la Pointe Arupa. 1884.—No. 3997. Océan Pacifique. Îles Marquises. Îles Hiva-Oa, Tahuata et Motane. 1884.—No. 3980. Océan Pacifique Sud. Nouvelles Hébrides. Île Espiritu Sancto. Baie St. Philippe. Croquis du Mouillage de Talomaco. Croquis du Mouillage de la Table. 1884.—No. 3983. Océan Pacifique Sud. Nouvelles Hébrides. Île Espiritu Sancto. Côte Est. Croquis de la Baie de Léké. Croquis de la Baie des Requins. 1884.—No. 3995. Océan Pacifique Sud. Nouvelles Hébrides. Croquis de l'Île Ambrym. 1884.—No. 3996. Océan Pacifique Sud. Nouvelles Hébrides. Croquis de l'Île Api. 1884.—No. 3974. Océan Pacifique Sud. Croquis des Îles Souwaroff. Croquis de l'Entrée du Lagon et du Mouillage des Îles Souwaroff. 1883.—No. 3988. Océan Pacifique Sud. Nouvelles Hébrides. Île Malicolo. Croquis du Port Sandwich. 1884.—**Dépôt des Cartes et Plans de la Marine, Paris.**

Norwegian Charts.—Generalkart over den Norske Kyst fra Kinn til Trondhjem-sleden, udgivet af den geografiske Opmaaling, Kristiania, 1884. Scale : 1,350,000 or 4·7 geographical miles to an inch.

Generalkart A 3.

Specialkart over den Norske Kyst fra Rundö til Ona, udgivet af den geografiske

Opmaaling, Kristiania, 1883. Scale 1:100,000, or 1·3 geographical miles to an inch. Specialkart A 14.

Specialkart over den Norske Kyst fra Tyrhaug til Terningen, udgivet af den geografiske Opmaaling, Kristiania, 1883. Scale 1:50,000 or 1·4 inches to a geographical mile. Specialkart B 38. (*Dulau.*)

United States Charts.—Pilot Chart of the North Atlantic Ocean. Nos. 2 and 3, Feb. and March 1885. U.S. Hydrographic Office, Bureau of Navigation, Navy Department, Washington DC.

ATLASES.

Cosmographic Atlas.—The ——— of Political, Historical, Classical, Physical and Scriptural Geography and Astronomy, with Indices and Descriptive letterpress. W. & A. K. Johnston, Edinburgh and London, 1884. Price 1*l.* 1*s.*

This atlas is divided into six different sections, containing 66 maps, arranged in the following manner:—The first 40 are Political maps; from 40 to 49 Historical, from 50 to 52 Classical, from 53 to 56 Physical, from 57 to 60 Scriptural, and from 61 to 66 Astronomical Plates. There is a copious Index to the Political maps, arranged on the principle usually adopted by this firm of publishers, viz., squares indicated by capital and small letters, instead of giving the latitudes and longitudes of the several places; it contains the positions of nearly 60,000 places. Each Historical map has its explanatory letterpress, and there is a separate index for this section. The same remark applies to Classical, Physical and Scriptural maps.

The Astronomical diagrams and the explanation of the plates are remarkably good; indeed this atlas, for the purpose of general reference or instruction, is far in advance of any, of the same class, that have lately been published in England.

France.—Atlas Historique de la——, depuis César jusqu'à nos jours, par Auguste Longnon. Première Livraison. Hachette et Cie, Paris, 1885. Price 9*s.* each part. (*Dulau.*)

Each issue of this atlas is to be accompanied by a pamphlet containing explanatory notes in which the authorities on which the maps are based are quoted, and a list of the Roman and modern names of all places shown on the maps.

The following are the maps contained in the first part of this atlas:—

Pl. I. La Gaule à l'arrivée de César, 58 ans avant l'ère chrétienne. Une petite carte annexe représente la division de la Gaule au temps d'Auguste (an 10 avant l'ère chrétienne).

Pl. II. La Gaule sous la domination romaine, vers l'an 400, de notre ère. Une carte annexe indique la répartition des cités de la Gaule selon les tribus romaines.

Pl. III. et IV. La Gaule et les pays voisins du VI^e au VIII^e siècle. Dix-huit cartes représentant la division ecclésiastique de la Gaule sous les Mérovingiens et l'état politique du même pays en 506, 523, 545, 561, 567, 573, 583, 585, 587 (traité d'Andelot), 594, 600, 622, 625, 628, 638, 714 et 768.

Pl. V. L'Empire de Charlemagne, 806.

Historischer Wand-Atlas, v. Spruner-Bretschneider. 10 Karten zur Geschichte Europas im Mittelalter bis auf die neuere Zeit. Scale 1:4,000,000 or 55·5 geographical miles to an inch. Dritte Auflage. Gotha, Justus Perthes, 1884. Price 3*l.* 3*s.* (*G. Philip & Son.*)

This Atlas contains the following maps:—I. Europa um 350 nach Christo. II. Europa im Anfange des VI. Jahrhunderts. III. Europa zur Zeit Karls des Grossen. IV. Europa in der zweiten Hälfte des X. Jahrhunderts. V. Europa zur Zeit der Kreuzzüge. VI. Europa zur Zeit des XIV. Jahrhunderts. VII. Europa zur Zeit der Reformation. VIII. Europa zur Zeit des 30 jährigen Krieges und bis 1700. IX. Europa im XVIII. Jahrhundert von 1700 bis 1789. X. Europa im Zeitalter Napoleons I. 1789 bis 1815.

Nederlandsche Bezittingen.—Atlas van de— in Oost-Indië, door Dr. J. Pijnappel Gz., Hoogleraar te Leiden. Derde op Nieuw Bewerkte Uitgave. Amsterdam, P. N. Van Kampen & Zoon, 1884. Price 12s. (*Stanford.*)

Oesterreich-Ungarn.—Physikalisch-Statistischer Hand-Atlas von—, in 24 Karten mit erläuterndem Text unter Mitwirkung von Vincenz v. Haardt, Prof. Dr. Anton Kerner Ritter v. Marilaun, Franz Ritter v. Le Monnier, General-Major Carl Sonklar v. Innstätten, Prof. Dr. Franz Toula, herausgegeben von Dr. Josef Chavanne und ausgeführt in Eduard Hölzel's Geographischem Institute, Wien 1884. VI. Lieferung, containing the following maps:—No. 12. Karte der Verbreitung nutzbarer Mineralien. No. 21. Karte der Zu- und Abnahme der Bevölkerung. No. 24. Karte der Geschlechts-Verhältnisse der Bevölkerung (Letztere Karte tritt an die Stelle der früher im Programm festgesetzten Karte des Creditwesens). Price 7s. (*Dulau.*)

Philip, G. & Son.—Handy General Atlas of the World, a comprehensive series of maps illustrating general and commercial geography; by John Bartholomew, F.R.G.S. With complete Index of 40,000 names. New and enlarged edition. G. Philip & Son, London, 1885. Price 2l. 2s.

This edition exhibits a considerable improvement on those that have been previously published. Care has been taken to bring the maps up to date, and the general index has been considerably enlarged. The maps are well drawn, and show the physical features clearly; they are not overcrowded with names. This atlas is well suited for the purpose of general reference, or for the use of students.

——— Popular Atlas of the World; a series of Maps showing the present state of Political, Physical, and General Geography; by John Bartholomew. F.R.G.S. With consulting Index. New and revised edition. G. Philip & Son, London, 1885. Price 1l. 11s. 6d.

This is a cheaper edition of Philip's 'Handy General Atlas,' the principal difference being that only thirty-seven maps are given, instead of fifty-five; but the maps given are identical with those contained in the more expensive atlas.

EDUCATIONAL.

Alpengebietes.—Uebersichtskarte des—, für Schüler bearbeitet von R. Petouq. Scale 1:506,000 or 6·9 geographical miles to an inch. Elberfeld, Fassbender. 10 sheets. Price 6s. (*Dulau.*)

Ancient World, Twelve Maps of the— (Atlas Antiquus) for schools and colleges, by Dr. Henry Kiepert. Eighth Edition: improved, corrected and enlarged. D. Reimer, Berlin, 1885. (*Williams and Norgate.*)

This Atlas contains the following maps:—1. Orbis terrarum antiquis notus. 2. Imperia Persarum et Macedonum. 3. Aegyptus.—Phoenice et Palaestina. 4. Asia citerior. 5. Graecia cum insulis et oris maris Aegaei. 6. Graecia ampliore modulo descripta. 7. Italia. 8. Italiae pars media. 9. Roma urbs. 10. Hispania, Mauretania et Africa. 11. Gallia, Britannia, Germania. 12. Imperium Romanum.

Asien.—Politische Schul-Wandkarte von—, von Dr. Heinrich Kiepert. Scale 1:8,000,000 or 109·5 geographical miles to an inch. 9 sheets. New Edition. D. Reimer, Berlin, 1884. Price 12s. (*Dulau.*)

Australien und Polynesien.—Schul-Wandkarte von— nach dem Entwürfe und unter der Leitung des Vincenz v. Haardt. Scale 1:16,000,000 or 119 geographical miles to an inch. Edward Hölzel, Wien, 1885. (*Dulau.*)

Berghaus, Dr. Hermann.—Stieler's Schul-Atlas. Vollständig neu bearbeitet von Dr. Hermann Berghaus. 64. Auflage. 33 Maps. Justus Perthes, Gotha, 1885. Price 6s. (*Dulau.*)

Europa's, Richard Kiepert's Schul-Wand-Atlas der Länder——.

Zehnte Lieferung: Politische Wandkarte von Deutschland. 6 sheets. Scale 1:1,000,000 or 13·6 geographical miles to an inch.

Siebente Lieferung: Stumme Physikalische Wandkarte der Balkan-Halbinsel. 6 sheets. Scale 1:1,000,000 or 13·6 geographical miles to an inch.

Zwölfte Lieferung: Politische Wandkarte von Oesterreich-Ungarn. 6 sheets. Scale 1:1,000,000 or 13·6 geographical miles to an inch.

D. Reimer, Berlin, 1884. Price 7s. 6d. each. (*Dulau.*)

These maps form part of the series of School Wall Maps which is at present being brought out by Dr. Richard Kiepert. They are executed in a bold style, the colours are well chosen, and they are worthy companions of the other maps of this series which have already been issued.

France.—Atlas pour servir à l'étude de la géographie de la——, par A. Vuillemin. Édition avec le tracé des chemins de fer. Delalain, Paris. Price 6s. 6d. (*Dulau.*)

Haardt, V. v.—Physikalisch-statistischer Schul-Atlas von——. (Als Supplement zu B. Kozenn's geographischem Atlas für Mittelschulen). Edward Hölzel, Wien, 1884. Price 4s. (*Dulau.*)

—— Geographischer Atlas für die höheren Classen der Volks- und Bürgerschulen in Niederösterreich. Approbirt mit Erlass des k. k. Ministeriums für Cultus und Unterricht vom 26 Juli 1881, Zahl 11,206. Eduard Hölzel, Wien, 1884. Price 3s. (*Dulau.*)

Historical Atlas.—The Public Schools Historical Atlas. Edited by C. Colbeck, M.A. London, Longmans, Green & Co., 1885.

This is an excellent little atlas, and shows great thought in the manner in which it has been produced. Advantage has been taken in the compilation of the maps of Spruner's Historical Atlas, Professor Freeman's Historical Geography of Europe and other standard works. The introduction of the plans of celebrated battles is a new feature in an historical atlas of this size, and it is furnished with a copious descriptive index.

Holy Land.—The——. To illustrate the Old Testament. Scale 1:380,000 or 5·2 geographical miles to an inch. With an inset plan of Jerusalem, on twice the scale of general map. Constructed and engraved by W. & A. K. Johnston, Edinburgh and London.

—— The——. To illustrate the New Testament. Scale 1:380,000 or 5·2 geographical miles to an inch. With an inset plan of Ancient Jerusalem. Constructed and engraved by W. & A. K. Johnston, Edinburgh and London.

Kampen, Alb. van.—Orbis Terrarum Antiquus in Scholarum usum descriptus ab Alb. van Kampen. Insunt Tabulæ XVI. cum XXVII. Tabellis. Justus Perthes, Gotha, 1884. Price 2s. (*Dulau.*)

Letts, Son & Co.—School Atlas of Modern Geography. 30 maps and Index. Letts, Son & Co., Limited, London, 1884.

—— Classical Atlas, compiled from the most recent authorities. 23 maps and index. Letts, Son & Co., Limited, London, 1884.

Mathematischen Geographie.—Wandkarte für den Unterricht in der——, in 9 Blättern mit erläuterndem Text. Entworfen und bearbeitet von Eduard Wetzel. Vierte verbesserte und vermehrte Auflage. Dietrich Reimer, Berlin, 1884. (*Dulau.*)

Oesterreich-Ungarn.—Schul-Wandkarte von—— (Politische Ausgabe), nach dem Entwürfe und unter der Leitung des Vinzenz v. Haardt. Scale 1:1,100,000 or 15 geographical miles to an inch. Eduard Hölzel, Wien, 1885. (*Dulau.*)

TAURANGA

ABOVE SEA LEVEL OF OBSERVATION ALONG ROUTE TRAVERSED

to corresponding positions on Map.

Feet		Feet
1600	<i>Manganui A te ao River</i>	
1500	(crossing places)	
1125	No 1	800
1295	" 2	850
1175	" 3	900
1130	" 4	1200
	" 5	1250
1400	" 6	1460
1120	" 7	1541
1200	" 8	2600
1180	" 9	2740
1185	" 10	2850
1190	69 Rugged Mountains	2900
2300	70 Mount Towai (camp)	3500
3200	71 Waimarino Plains	2850
3100	72 Ngatokorua Pa (camp)	2833
	73 Okahukura (camp)	3300
4000	74 Source of Whanganui	
	(Tongariro)	3700
7376	75 Tongariro Hot Springs	4800
3450	76 Te Pehere (Te Kooti's Pa)	2300
	77 Te Pakehu Plain	2000
6200	78 Ruwharua	2420

38

NEW ZEALAND

Scale of English Miles

0 50 100 150 200

Mt. Hery-Nicholls Route

Railways

176

178

180

178



PROCEEDINGS
OF THE
ROYAL GEOGRAPHICAL SOCIETY
AND MONTHLY RECORD OF GEOGRAPHY.

Afghan Boundary Commission; Geographical Notes. III.

By Major T. H. HOLDICH, R.E.

(Read at the Evening Meeting, March 23rd, 1885.)

Map, p. 352.

[MAJOR HOLDICH's paper was read to the meeting by General J. T. Walker, who made the following introductory remarks:—

At the present time the eyes of the whole civilised world are turned towards that dimly known region, the Northern Frontier of Afghanistan, with anxiety and apprehension lest a casual encounter between a few Afghans and Cossacks, or more probably the action of some semi-Asiatic Russian general hungering after military distinction and advancement, should precipitate into war the two great nations who have hitherto been the pioneers of civilisation in Asia; for such a war would perpetuate the reign of rapine and bloodshed which has long lasted over a region now desolate and deserted by man, but which was once fair and happy and well peopled, and may become so again very soon, if only England and Russia can learn to look on each other as friends and not as foes, in Asia as well as in Europe. Thus at this time it is a great gratification to me to have an opportunity of bringing prominently to the notice of the Royal Geographical Society the labours of three officers of the Royal Engineers—Major Holdich, Captain Gore, and Captain the Hon. M. G. Talbot—who served for some years under my orders in the Survey of India, and are now attached to the Afghan Boundary Commission as survey officers, because in their present sphere of operation they have already done much to throw light on a region of which the information hitherto forthcoming has, unhappily for the peace of the world, been very vague and conjectural, not merely, as regards the mapping of the country, which in many parts was exceedingly inaccurate, but also as to various essential particulars regarding the races by whom it is inhabited, their distribution *inter se*, and their modes of life.

All three officers served with distinction in the late Afghan war, and when not actually serving with the army in purely military duties they were employed in surveying, an occupation which you may probably regard as very peaceful and harmless; but surveying in an enemy's country is liable to be carried on with greater risk from foes lying in ambush than is incurred in fighting an open enemy on the battle-field; and when, as in Afghanistan, the survey is conducted in a region teeming with fanatical Mahomedans, who are taught by their priests to believe that the slaughter of a Christian, however treacherously and villainously accomplished, is a sure passport to heaven, the surveyor must have no little fortitude and resolution, and much keenness of apprehension in deciding where he may go to and when. Happily the officers of the Survey passed almost scathless through this ordeal, and notwithstanding the many difficulties under which they laboured they succeeded, during the war, in making extensive and very valuable additions to our knowledge of the geography of Afghanistan; indeed I believe it may be said without exaggeration that their maps and the geological survey map constitute almost the only benefit which science and civilisation have derived from England's second venture in Afghanistan. Shortly after the war a military expedition against a frontier tribe, the Mahsúd Waziris, who had been raiding into British territory, afforded Major Holdich an opportunity of ascending some high mountain peaks on the eastern borders of Afghanistan, the observations at which enabled considerable additions to be made to the previous maps. That was followed by an expedition to the Takht-i-Suliman, or Throne of Solomon, the highest peak of the well-known Sulimani range, which forms so considerable a portion of the western Indian frontier. This expedition is specially remarkable in that it is the only instance I know of, in the course of upwards of thirty years' experience of survey operations on the frontier, in its entire length from the head of the Assam valley round to Lower Sind, in which the Government has despatched a military expedition across the frontier solely for the purpose of acquiring geographical information; it was undertaken on the urgent recommendation of Major Holdich, who represented that a large extent of unknown country might be surveyed from the summit of the Takht and collateral points, and that observations were also wanted in this quarter to supplement others already taken on the Waziri mountains. Now there is no more liberal government in all the world, probably none so liberal, as that of India in all matters regarding surveys and scientific investigations within its own limits, but it has invariably displayed an unfortunate want of enterprise as regards the extension of geographical knowledge outside those limits. In every instance but this one, we owe our geographical acquisitions beyond the frontier to the initiative, not of the Government of India, but of the lawless marauding tribes on the border; these tribes have come raiding

into British territory, and thus compelled the Government to send troops to pursue them into their own country, and while there to make a survey of it. In some few instances Government officers have exceeded their authority and gone across the frontier, making surveys or acquiring useful information; but so far from being encouraged for their enterprise, they have invariably been censured, and they were fortunate if they escaped deprivation as a punishment for a breach of the frontier regulations. Thus it is a feather in Major Holdich's cap that he succeeded in moving the Government to despatch this expedition to the Takht-i-Suliman. I need scarcely tell you that he made the most of the opportunity it afforded him for making additions to the map of Afghanistan.

The next expedition into Afghan regions was initiated by a marauding tribe, residing in the Zhob valley, which made a raid into British territory, and had therefore to be visited by a British force in their own country. Major Holdich was summoned from a brief holiday in England to accompany this expedition, and had just overtaken it, when he had the gratification of being appointed to the command of the survey detachment with the Afghan Boundary Commission which he immediately proceeded to join. He has already communicated two interesting geographical notes to this Society—published in the 'Proceedings' for January and March—on the route taken by the Mission in advancing from Quetta to Herat, along the line of the frontier between Persia and Afghanistan. The second of these notes closes with the intimation that the Mission had reached a line of low hills overhanging the village of Parah from which at last Herat could be seen "spread out in a wide open plain to the east, dark here and there with thick lines of fruit-trees, whitened here and there with long lines of bastioned walls lit up by the western sun, and the glint of minarets, and the curious patchwork of light and shade which denote a great city."

His third note, which I am about to read to you, was written from the winter quarters of the Mission at Bala Murghab, far to the north of Herat, on the border between the Afghans and the Turkomans. It is of particular interest at the present moment, as it gives some account of the country to the north of Herat, the very region which is now in dispute between Russia and England as regards the territorial claims of the ruler of Afghanistan.]

Herat.—Herat has been frequently described by travellers previously, and for all information respecting its immediate surroundings, its defensive walls, its citadel, its buildings and its streets, the writings of those travellers must for the present be the authority. No member of the Commission has as yet been allowed to visit Herat, and nothing better than the impressions gained by a more or less distant view, sup-

plemented by verbal information received from some of its inhabitants, can be offered to geographers.

But there were one or two very distinct impressions to be gained by a distant view, chiefly that of its open position, and liability to capture. The villages cluster round it right up to the foot of the mud walls surrounding the city, and the city itself is commanded from almost all sides. A very careful drawing, made by Mr. Griesbach, of the Geological Survey, from a point less than two miles distant, illustrates this very fully, and also shows the generally ruined appearance of the interior. It could be invested without much difficulty. The villages on all sides afford capital cover; and the impossibility of destroying these mud-built villages, and so far removing the débris as to destroy the cover also, has been sufficiently well illustrated in the last campaign at Kabul, when an attempt was made to destroy such cover round Sherpur. That Herat should have changed hands so often, and so easily, is no matter of surprise to any one who looked down on it across the open plain from the Parah hills. That it should ever have made an effective defence is much more matter for surprise.*

The valley of the Hari Rud is a singularly straight, well-defined valley—just as it is shown in the present maps of Turkistan—with very marked limits both to the north and south. The southern line of hills which we crossed at Parah is of comparatively insignificant altitude, the highest peak of it (Do Shakh) being about 7500 feet above sea-level, instead of 12,000, as entered on some of the most modern maps. At Parah the hills are not more than 500 or 600 feet above the city, but exact altitudes can only be given when final observations are taken. The Paropamisian mountains immediately north of Herat rise to respectable altitudes, some of their peaks being nearly 10,000 feet above the sea, and as they trend eastward, gradually gathering themselves into the central watershed of the Koh-i-Baba, they also gradually increase in height. Until exact information can be given, it may be pretty safely concluded that 15,000 feet is the utmost limit in height of anything west of the Koh-i-Baba. There was no snow visible anywhere as the Mission approached from the south, and up to this date (end of December) only a slight sprinkling has been observed on the highest points. Westward from Herat this northern watershed bends considerably to the north, at the same time diminishing rapidly in altitude, bifurcating in long. $61^{\circ} 30'$, and tailing off in two minor ranges to

* Nevertheless, Herat enjoys the pre-eminence of having stood more sieges than almost any other city in Central Asia, having been depopulated and destroyed oftener, and always having risen from her ruins, if not with renewed splendour, at all events with a vigour and a tenacity of life that is without a parallel. (*Macgregor.*)

The population has been liable to great fluctuations. Ferrier says that before the siege of 1838, when it was so bravely defended by Eldred Pottinger, the number was 70,000, and when the siege was raised 6000 to 7000 were all that remained. Pottinger considered it to be a city of more trade than perhaps any other in Central Asia.—[*General Walker.*]

the Hari Rud. A direct route connects Kuhsan with the Kushk river at Kara Tepeh, crossing the watershed at Chashma Sabz (called Chelma Sanz in some of the old maps), and the actual rise and fall over the backbone of the range is barely 1000 feet. Two other northward routes cross it between Chashma Sabz and the Hari Rud, one of which is the Kumbau. Eastward of the Chashma Sabz route are the three well-known passes of Ardewán, Hazrat Baba, and Zirmust, all of them trade routes at certain seasons of the year. Although these must be considered the main roads northward, yet they deal with very different conditions to those on the west. They are not only higher, but by no means so simple. General Walker's Turkistan map very correctly shows rather a succession of "kotals," or watershed crossings, than a simple pass over a narrow ridge. But a detailed description of these passes is hardly within the scope of such notes as these.

The Hari Rud Valley.—To return to the actual route of the Mission. From Parah the direct road to Herat sloped gently down eastward into the Hari Rud valley. It was apparently a fine open road all the way. Our route, however, struck off to the north-west, crossing the hills by a narrow track which was not always easy to find, as it wound in and out of ravines, and over minor watersheds, till it finally struck into a fairly open nullah bed, which carried it down to the valley of the Hari Rud. There was nothing remarkable about this byway into the valley. It was not a good road, but it was sufficient to take the party to Zindajan, without passing in dangerous proximity to Herat. The valley of the Hari Rud, west of Herat, would be much better described by any traveller passing through it in spring or summer than in November, when the bleak north-west winds swept over its wide plain, and raised dust enough to hide all appearance of its abundant fertility. The villages Zindajan, Gorian, Rosanak, &c., are very large, and always surrounded by a network of mud walls. So that it is not always easy to see how much of the village is fully inhabited, and how much consists of merely empty mud buildings. There was a very large proportion of the latter in every village that could be thoroughly explored.

Not far from Zindajan the road to Kuhsan crossed the Hari Rud river, which is here divided into several streams, none of which, in the month of November, were more than a foot or two in depth. The valley at Rosanak still retained the same wide open appearance which it presented about Herat. After leaving Rosanak, however, it narrows considerably, and at Tirpul is less than a mile in width. At Tirpul (as the name suggests) is a bridge in a very fair state of preservation. Its construction is exceedingly strong, and the design is really ornamental. The striking similarity in the appearance of this bridge with a sketch of the bridge of Pul-i-Khatun which was taken by Mr. W. Simpson, the special artist of the *Illustrated London News*, suggests that both were constructed by the same engineer. The Tirpul bridge is still practically

efficient. The parapets, and some of the roadway of the approaches have disappeared, but the bridge itself wants but little repair to make it thoroughly effective. Not far from the bridge-head—on the left of the road—are the remains of what must once have been a handsome sarai, or rest-house for travellers. Even now it affords welcome protection against the bitter northern blasts which pour through the funnel of this narrow valley.

The valley opens out again before reaching Kuhsan, which is situated in a rather high and exposed position about a mile from the right bank of the river. The cold here was intense, owing to the strength of the northern wind. The thermometer registered on the night of the 16th November about 20 degrees of frost; but the actual temperature was nothing unless aggravated by the fierce north and north-west wind, against which protection seemed impossible. Fortunately, Kuhsan was one of the few places where there was abundance of wood to be had for the trouble only of cutting.

The Badghis District.—On the 23rd November, after the junction between the two sections of the Commission, which had started from India and England respectively, and after a good base had been secured for the continuance of survey operations, a fresh start was made northwards, and survey parties pushed forward in all directions for the mapping of the most important tract of country yet encountered. Throughout that rather indefinite district known as Badghis, which apparently includes everything north of the watershed of the Herat valley to Penjdeh, between the Hari Rud on the west and the Upper Murghab on the east (although some local authorities make it a much smaller area by limiting its western boundary to a line running north through Gulrân, or Gurlin, as it is called on present maps), there is not a single place of importance that is even approximately correct in geographical position. This is not surprising, considering the materials from which the present maps are compiled. It is a noticeable feature that the small topographical details are in many parts most curiously accurate, and this apparent anomaly would naturally occur in a compilation from carefully surveyed traverses, of which the ends were based on no fixed position. Reference has already been made to the line of mountains which form the northern watershed of the Herat valley, and which are usually called either the Paropamisus or Kaitu or Koh-i-Baba.

From this great watershed (of which the Tirband-i-Turkistan is an offshoot) the drainage runs away northwards through a most interesting but almost indescribable country. The view from the mountains, looking northwards towards Sarrahs and Merv, is as if a vast sea of liquid sand had been violently agitated by a passing storm, and had then suddenly been consolidated by some miraculous agency ere the waves had time to fall. It is a sand glacier stretching northward and westward as far as the eye can reach. Each many-folded wave of hills

looks diminutive and insignificant from the height or distance of the Koh-i-Baba, or of the Band-i-Turkistan; but a nearer acquaintance with those waves dispels the illusion. They rise from 200 feet to 600 immediately above the valleys and about their indefinite central watershed; between any two great streams, they reach 1000 feet or more. From the point of view of the valleys they become round-topped, smooth-sided hills, difficult to ascend from their steepness, and almost impossible to represent on any system of geographical topography on account of their multitudinous summits. And they are not sand, though they get more and more sand-covered as they approach the northern desert. They are composed of sandstone-clay, and are not only cultivable on their lesser slopes, but marvellously fertile. We are all looking forward to the days of spring, when grass knee-deep, spangled with flowers like an American prairie, will cover them. The stiff, straight, dried-up stalks of a bygone summer, which even yet cling to the northern and less sun-dried slopes, will then have disappeared, and the whole country will be green.

Passing over the Chashma Sabz Pass, one section of the Commission dropped rapidly down into a very traversable watercourse which wound and twisted its way towards the river Kushk. The march was rapid, and surveying was carried on with difficulty, owing to the small strength of the survey party which could be detached for work along any one route; but there was ample time to note the general nature of the road, its difficulties, and surroundings. The edges of the narrow little rivulet were fringed with a tangle of briar like an unkept hedge-row in England, and the stream itself wound along like a ribbon of bright green, twisting about the bases of yellow hills, on which the stiff unbending stalks of the *assafetida* plant stood at intervals like sentinels. There was hardly a sign of a village or habitation of any description on the spots selected for camping. Deserted graveyards, often on the ridges and hill-tops, wherein might generally be found a few carved stones, the quaint designs on which showed great artistic skill, were usually the only token of human existence. Game was abundant. Chikór could be shot near the camps like partridges at home in the early days of September, and herds of deer (we have not yet quite satisfactorily established the variety, they appeared to be a cross between antelope and sheep) could be counted by the dozen as they wandered gently over the hills for their evening visit to the springs.

The first few marches north of the Koh-i-Baba carried us over a constant succession of watersheds from stream to stream, till we struck into a wider and more defined valley than usual, called the Maghur. Our entrance into this valley was promptly disputed by a "sunder" of wild pig; but as the ground was good for riding they had speedily to give in, after leaving four or five gigantic specimens of their race on the level banks of the river. A long straight run down the Maghur

for about 20 miles brought us to its junction with the Kushk at Kara Tepeh, and from that point we followed the Kushk river to Pul-i-Khishti.

A description of one of these Badghis valleys might almost serve for all. Varying in width from one to three miles, hedged in by the hills which bound them on either side like a wall, and thus protected from the sweeping wind blasts which drive over the higher levels—curling up the dried vegetation in the autumn, and leaving marks on the soft surface of the hills like the marks in the bed of a torrent—these valleys should be havens of rest and verdure. The water supply is ample, and the possibilities of irrigation and cultivation abundant. The soil is excellent, and nothing seems wanting but the hand of man to till them and to take from them that which they are so capable of producing. I have seldom seen such valleys—such a land of promise, and yet so strangely desolate and deserted. It is the Turkoman raider who is the curse of this country, and he has been so from time immemorial.

Kara Tepeh ("black mound") is but the remnants of an old mud-built fort surmounting a mound which may possibly be artificial, though all signs of the excavations from which so large a mass of earth was taken have long since disappeared. The mound stands near the junction of the Kushk and Maghur, overlooking it, in fact; and the fort is in the last stage of decay. Its only importance is derived from the fact that it commands two roads towards Herat. From Kara Tepeh to Chaman-i-bed, where there is another ruined fort, again commanding a somewhat important river junction—viz. that of the Dahna Islam, which combines the Gulrân and Ak Robat streams with the Kushk, the road still follows the Kushk valley, only avoiding a bend in the course of the river by passing over a spur of the hills on the left bank, not far from Kara Tepeh.

At Chaman-i-bed were the first signs of cultivation and the first Turkoman encampments. A few settlers had come up the river so far to prepare the ground ere winter set in, and they looked out at us curiously from their little towers of protection against raiders, as we passed them. They were ploughing and digging water cuts and channels for irrigation. They plough deep and use horses for draught. At about 21 miles from Chaman-i-bed down the valley of the Kushk, stands Kala (or Kila) Maur. There is no vestige of a fort existing here, except the comparatively modern ruins of mud walls surmounting the site of the ancient Bakshur. The city of Bakshur must once have covered an area of about half a square mile or more on the left bank of the river. The débris of the old city and its walls now form an irregular mound, of which the surface is strewn with bricks and broken pottery. The crown of an old brick-built arch was distinctly recognisable on the surface of the mound, and many of the fragmentary pieces of pottery bore traces of both art and skill in manufacture, such as is probably

lost. I have observed nothing like it elsewhere. About a mile north of Bakshur, on the same bank of the river, were signs of another sand-buried city of almost equal extent. The sand hills which closed in the valley at Chaman-i-bed, and south of it, were here diminished in height and receded far from the left bank, so that Bakshur stands more or less in an open plain, which in bygone ages may have been rich and fertile. Now, however, the steadily advancing sand sea has overlapped this district, and probably only a comparatively narrow margin near the river is cultivable.

For about six or seven miles before reaching Kala Maur, the waters of the Kushk had disappeared underground. At Kala Maur they again come to the surface. For the next 20 miles the Kushk flows with a steady current to Pul-i-Khishti (or bridge of bricks) which, as the name implies, is a strong brick-built construction across the river about a mile (or rather less) above its junction with the Murghab. The valley becomes again confined and narrow after passing Kala Maur, the sand hills rising to 300 to 500 feet above the level of the valley, and often shelving down with steep scarped slopes to the river banks. A great deal of the water is here utilised for cultivation, a very deep canal being carried along the right bank up to and through the delta formed by the junction of the two rivers. Pul-i-Khishti is not altogether a bridge. Had a mere roadway alone been required, the construction would have been different. It was intended chiefly as a "band" or dam to secure a head for further irrigation on the left bank of the river. It has also served as an aqueduct for higher level irrigation, the fall of the river above it being considerable. In a much simpler form this construction is common enough in northern Afghanistan. I have seen several instances in the Wardak or Logar valleys south of Kabul.

Ak Tepeh ("white mound") is a very remarkable point commanding the junction of the two rivers. As the name implies, it is a *white* mound which, under sunshine, is conspicuous for many miles round. The position consists of this mound which is about 150 yards long and 70 or 80 wide, irregular in shape, about 100 feet above the valley level, surrounded at present with an inefficient wall and showing signs of occupation from the very earliest times. Whether it is artificial or natural it is hard to say. Some faint traces of stratification were observable, but not enough to decide the question for certain. Five or six miles before reaching Pul-i-Khishti the hills on the right bank of the Kushk cease, trending away round to the left bank of the Murghab, and leaving a well-defined delta to fill in the fork between the two rivers. This delta is a kind of steppe, for the rivers run in narrow valleys some hundred feet below it, and out of this valley rises Ak Tepeh as if it were originally part of the steppe cut off by some act of nature from the rest. The top of Ak Tepeh is on a level with the steppe, and some 500 or 600 feet lower than the hills four miles away to the south,

or those near by on the north side of the Murghab. It may be mentioned that there are other mounds besides Ak Tepeh, not far from it on both sides, similar in character, but much smaller. These would make it appear to be a natural formation, as there is no apparent artificial object to be gained by their existence. Ak Tepeh is distinctly the strongest and most important strategical position in the country. It dominates all the roads to Herat, which diverge from the head of the Kushk and Murghab as well as the great high-road to Maimana and Balkh from Persia, and it bars the way to the entrance of the two finest and most fertile valleys north of the Paropamisus and Koh-i-Baba. The Murghab is a deep and impassable river near Ak Tepeh. It is from 50 to 70 yards wide, flowing between high banks, and is said to be unfordable even at the season when it is low, which was when we were there in December. This, however, I have reason to doubt. The ruins of the old Penjdeh fort are some five miles up the Murghab, on its left bank, and the new fort is a mile or so further up. The latter is not remarkable in any way. The Sarik Turkomans now occupy this ground in great force; all the five divisions of the tribe being represented in separate sections with their "kibitka" (blanket-covered huts) villages dotted over the level plain on both sides of the river; interspersed with a few more permanent mud-built places. They are a pleasant, friendly lot of people, well disposed towards us, but too well off to care much about trade. The few Jews that live amongst them did nearly all the trading in carpets, kurjins (saddle-bags of a sort of carpet manufacture), and silver ornaments; the latter being handsome, but coarse in workmanship. The entire absence of arms amongst them was a noticeable feature, particularly when taken in connection with their dexterity with their triangular spades. They are distinctly agricultural in their tendencies, and not military. It is said that it takes some time to appreciate the points of the celebrated Turkoman horses. I have not arrived at that point, yet there is great appearance of breeding about their fine heads, small ears, and large full eyes; but for the rest they are (taking them all round) a weedy-looking race, with no quarters, no bone, and no compactness, and I doubt whether we saw a horse with four sound legs amongst them. Their capability for such feats of endurance as we know they are occasionally called on to perform is evidently due to most careful training and preparation beforehand. A stroll into the Turkoman encampments was always interesting. They live in circular huts made of thick felt blankets stretched over a wooden framework like gigantic beehives. The door is always closed with a hanging carpet. The women make the carpets, and many ornamental devices for decorating the interior of their huts besides. Turkoman women are not perhaps so much "en evidence" as the men, but they showed no particular shyness. Their features are too irregular for beauty, but they have the same open pleasant expression as most of the

men. Their dress was often most picturesque; the head-dress being a small silver cap with a handsome silk puggree skilfully twisted round, and occasionally long silver pendants attached which fall over the shoulders. The dress itself appears to be a long loose garment, confined at the waist with a kummerbund, or loose pyjamas. The material of the dress was sometimes silk, and exceedingly handsome in design. The authority of the women in the family circle was often amusingly obvious.

The Band-i-Nadir is a bund, or dam, across the Murghab, from which five irrigation canals diverge and are carried down the banks of the river. These five canals are said to be appropriated by the five sections of the tribe, which thus each possess their own water supply for purposes of cultivation in equal proportion.

The only place of importance between Penjdeh and Bala Murghab is Maruchak, where there is the largest fort we have seen, and the remains of a brick bridge which might be reconstructed without great difficulty. The Murghab valley widens very considerably at Maruchak, where it is two or three miles across. Much of the ground adjoining the river is low and swampy, and covered with a thick tangle of high reeds and grass. Wherever there are reeds and grass in this country there wild pig abounds, and there too are to be found pheasants in numbers that can only be seen elsewhere in a very well preserved covert in England. The road to Bala Murghab crosses the river at Maruchak, and follows the right bank to Karaol Khana and Bala Murghab. Existing maps of this part of the country are very erroneous. The total distance between Penjdeh and Bala Murghab is about 41 miles, and both these places are at present shown far to the west of their correct position in longitude. Bala Murghab fort is now in a state of good preservation, the camp being a little to the north of it on the same bank of the river, and the fort occupied by the Amir's troops. The direct road to Maimana leaves the valley about two miles north of the fort. Another route, probably equally good, but which does not touch Bala Murghab, is by the Chaba Shamba river which joins the Murghab at Karaol Khana.* Bala Murghab can thus hardly be said to command the Maimana road. Grodekoff's route again is south of Bala Murghab, along the foot of the Tirband-i-Turkistan (which possesses a variety of local names), and is not a recognised route for traffic at all. The Tirband-i-Turkistan is a distinct range, although an offshoot from the great system of mountains which culminate about longitude 66° 30'. To the south it shelves down to the Murghab basin in cliffs and precipices. To the north it sends out long flattish spurs, up which many a rideable track can be found. A few days before Christmas the rather unusual sight of a mounted party in pursuit of ibex and wild sheep might

* I have very little doubt that Bala Murghab and not Maruchak will be identified as the *Merv Rud* of the old Arab geographers.

have been seen on the very crest of the mountain, which (so far as at present fixed) runs to about 9000 or 10,000 feet above sea-level. Beyond the Tirband southward a magnificent view is obtained of the Ferozkhoi country, which appears to comprise the whole Murghab basin. Northward the rolling sand dunes slope away to the far horizon in endless smooth-topped waves. It is one of the most remarkable panoramas I have ever seen.

In introducing the subject of the evening,

The PRESIDENT said that both Major Holdich and General Walker were well known to the members of the Society. They were already indebted to Major Holdich for several most interesting papers, one of which he read himself before the Society. He was engaged during the whole of the late warlike expeditions in Afghanistan, where he saw a great deal, and what he saw he was able to describe with singularly graphic power and fidelity. He was now employed upon the Commission for settling the boundaries between Afghanistan and the Russian territory. He had served as an officer in the Great Survey of India under General Walker, than whom there was no more competent authority with regard to the geography of that district. Major Holdich's recent observations showed that many geographical positions which were assumed to be correct were very incorrect; that there existed a good deal of doubt with regard to matters which persons who had not entered so carefully into the subject as he had done had been apt to treat as not doubtful; and that in fact our maps were misleading upon many points. The country about Herat was one of singular historical as well as geographical interest. Herat was one of the most important of the numerous cities that were called after that wonderful conqueror Alexander the Great. There seemed little doubt that Alexandria in Ariis occupied the site of the modern Herat, and that the valleys there once teemed with population, and were filled with towns of great size and wealth. The name of the district also was interesting to us from its supposed association with the Aryan race. When the primitive tribes of that race descended from the higher mountain valleys to the fertile river plains, the plain around Herat was probably one of the first which they peopled and where they increased in numbers and importance. Down to very recent times the country was richly cultivated and inhabited by people collected in great towns. They had been replaced by wild hordes, including in their numbers some of the most savage tribes that ever desolated a fertile region. Papers had been read before the Society by Colonel C. E. Stewart, the late Mr. O'Donovan, and others, describing the present inhabitants. However, interest was now centred upon the question of the geographical limits of the country and the settlement of the point as to what belonged to the Turkomans conquered by the Russians, and what belonged to the Afghans. The Society simply looked at these matters with a desire for information, and he was sure they would listen to the paper and discussion utterly undisturbed by any political passions. If they would otherwise have been inclined to show partisanship, they would be restrained from doing so because they have the pleasure of having amongst them that evening as their guest M. Lessar, who knew the country so well. He appeared in England as the representative and the advocate of the interests of his own country, Russia, and as such they would all listen to him with respect. The Geographical Society had repeatedly received from him most valuable information which was always given with the utmost courtesy and readiness.

After the paper,

General WALKER said:—As our President and other gentlemen will probably address you on the subject of the interesting paper which I have just read, I will

make no comment on it further than to explain that the inaccuracies which Major Holdich and his officers have discovered in all the hitherto published maps of the regions north of Herat, including the map of Turkistan, of which six editions have been published in India under my direction and responsibility, are simply due to the circumstance that the existing geographical materials were altogether inadequate for the construction of a correct map. The evidence on which positions were assigned to various places was often mainly conjectural; thus we now know from actual survey that the position of Penjdeh relatively to Herat is about $5\frac{1}{2}$ miles closer in latitude and 10 miles further in longitude than the Turkistan map indicates; also that the fort of Maruchak is three miles further in latitude and no less than $22\frac{1}{2}$ miles in longitude, and that Bala Murghab is six miles further in latitude and 11 in longitude. These are three of the most important places on the Afghan frontier, and are all in one district, so that the magnitude of the errors in their relative positions *inter se* is all the more remarkable. But the errors have not been geographical only; there would seem to be as much ignorance of the people themselves as of the country they inhabit. For we find M. Lessar, the Russo-Afghan Boundary Commissioner who is now in London, and who honours us by his presence at this meeting, giving a character to the Sarik Turkomans generally which is quite at variance with the character given by Major Holdich to an important branch of that tribe, the Sariks of Penjdeh in Afghanistan, who appear to be a special bone of contention at the present moment. M. Lessar is reported by the newspapers to have said that the Russians "have not attempted to unite all Turkomans, but only to bring under their power the Sariks, not because they are Turkomans, but because they are robbers." Now though this is, doubtless, quite true of certain of the Sariks, it can scarcely be true of the Sariks of Penjdeh, of whom Major Holdich tells us that "the entire absence of arms amongst them was a noticeable feature, particularly when taken in connection with their dexterity with their triangular spades; they are distinctly agricultural in their tendencies, and not military." These men surely deserve to be regarded as something better than robbers. M. Lessar's patriotic advocacy of his country's claims may well win the admiration of all Englishmen. But instances like the present show that Englishmen may justly question the validity of those claims. Thus it should be apparent, as I have already maintained elsewhere, that maps constructed with very imperfect geographical materials and with very little knowledge of the people of the country, cannot be expected to give accurate delineations of the boundary lines of different States, more especially when the States themselves have not been consulted as to their respective territorial claims; therefore, for the true delineation of the northern Afghan frontier line we must wait until the labours of the Boundary Commissioners and the Survey officers are completed.

The Secretary, Mr. C. R. MARKHAM, then read the following observations on the paper written by M. LESSAR :—

The diversity of opinion on the question what part of the country should be named Badghis is of quite recent date (from 1883). During my travels I was always told by neighbouring inhabitants that the name is applied to the hilly country between the Upper Murghab and the Khushk. This is confirmed by Captain James Abbott, who travelled in these parts in 1839. He went to the north from the village of Khushk through Chaman-i-bed, and near this last point, he says, ends the country named Badghis, and further on the place is named Maour, and at Kalei Maour the kingdom of Kharesm begins. It was also thus that Badghis was indicated in maps before 1883. Furthermore it is confirmed also by the ancient descriptions of the Badghis, "it is full of timber and trees;" that is quite true speaking of the northern slope of the Paropamisus; but nobody certainly will name woody the country

between the Khushk and the Hari-rud, where only rarely, and at great distances apart, are isolated pistachio-trees met with. Thus the opinion of the local authorities, of whom Major Holdich speaks, appears to be the true one. The region between Khushk and the Hari-rud by the neighbouring tribes is simply called Tchull (desert), and probably the absence of a separate, definite name is the reason why in Europe the name of Badghis was applied to the whole country. Owing to the very different character of the two parts of it, this confusion leads to many misunderstandings; all that is said of the richness of Badghis is applied very erroneously to the Tchull. Major Holdich says: "A description of one of these Badghis valleys might almost serve for all. The water supply is ample, and the possibilities of irrigation and cultivation abundant. The soil is excellent,"—&c. These words, which can be applied only to places between the Murghab and the Khushk, led to the error of believing in the richness of the country between the last river and the Hari-rud. In Central Asia the richness of a country depends principally upon the abundance of water for irrigation. A very indifferent soil, where water is abundant and good, gives rich crops; while on the contrary, the best soil without water produces nothing. In the latter case the best thing is a soil with a great predominance of sand, which is not at all available for cultivation but produces rich pasturage. Generally not only between the Khushk and the Hari-rud, but in the whole Transcaspian Territory, the most part of the country, not covered with sand, consists of sandstone-clay—a soil very propitious for cultivation; but nevertheless the country is very poor, owing to the scarcity and often to the complete absence of water. In this respect the country between the Khushk and the Hari-rud is in a very bad condition. On the north of the Barkut Mountains (or Paropamisus) only the valleys of the Khushk, the Murghab, and Hari-rud are cultivable in the places where the height of the banks permits of bringing the water for irrigation. Such places are frequent on the Khushk and the Murghab, but along the Hari-rud, on the contrary, they are very rare. But as to the country between the two rivers, on the north of latitude $35^{\circ} 20'$, only at Kerizi-Elias is there a small rivulet with water sufficient for the irrigation of a small garden or field; in all other places the water in wells or rivulets is quite insufficient and in many cases contains salt; such water, even when it is good enough for shepherds and their flocks, is not available for cultivation. In some streams (e. g. Dahna Islam, which the Tekkeh name also Egri-Geuk) the water is completely brackish and not drinkable even for flocks. A glance at the map is sufficient to show that no irrigation works can bring water to the middle part between the rivers. Without exaggeration it may be said that all that part is not available for cultivation. The more northern part, from latitude $35^{\circ} 40'$ near the Elbeerin Kir (where sand predominates in the composition of soil), presents very good pasturage.

M. LESSAR added the following remarks (speaking in French):—It seems to me that there reigns a confusion in respect to the maps: only maps accompanying treaties as their explanation, can serve as documents for delimitation. The other, even if made by official departments, cannot have the same significance in this respect. They are compiled from sources of different value, from the most careful instrumental surveys to simple reconnaissances. It is with the latter that one must be contented for little known and accessible countries in order not to leave blank spaces on the maps. General Walker speaks of the coincidence of the frontier on Russian maps with the one on his map, as proving that the Russians being aware of the claims of the Turkomans, accepted General Walker's view of the Afghan frontier. I cannot agree with that: the country was unknown, and probably this part was simply copied from General Walker's map, which had the reputation of being one of the best maps of Turkistan, without agreeing by that fact

with any view at all. Many parts of General Walker's map are compiled from Russian sources. Before the fall of Geuk-Tepeh, and even the occupation of Merv, we could have very little knowledge of the claims of Turkomans in these regions; only quite lately began the surveying of the country, and from that time our maps largely differ from General Walker's. The permanent frontier between Turkomania and Afghanistan ought certainly to be defined according to the mutual rights of both parties, and not on the basis of a fancy line drawn on a map previous to the study of the country.—The third remark refers to the character of the Sariks: Major Holdich says that they are a pleasant, friendly lot of people, and I described the Sariks as robbers. I think that we both are right; I spoke of this tribe before the occupation of Merv, and in that time the Sariks were certainly robbers, all descriptions agree upon that. Major Holdich speaks of the Sariks as they are after the pacification of the desert by the Russians, and in the presence of an English detachment in their neighbourhood; the difference proves only how important it is to make the pacification definitive.

Sir HENRY RAWLINSON said he had no personal acquaintance with the country now under discussion. Although he had approached Herat on both sides, he had never actually crossed or reached either the Hari-rud or the Murghab. His acquaintance with the subject had been derived mainly from books and study, as well as from inquiry among the inhabitants, having been for a year or so in charge of our political relations with Herat after the retirement of Major D'Arcy Todd from the city in 1841. In the capacity of an actual observer he entirely yielded to M. Lessar, who he believed was the first European to perambulate the large district of Badghis. He himself had always taken a great interest in the region in question, not merely on political grounds, but because Herat and the neighbouring country had occupied a very prominent place in Oriental history, both ancient and modern. It was especially from the geographical point of view that he had pursued his studies with regard to it. This was hardly perhaps the place or occasion on which to enter upon learned discussion on questions of etymology or ancient geography or ethnography, but still he could not help alluding to such subjects in the few remarks that he was about to make. The desert character of a portion of the region east of the Hari-rud, to which M. Lessar had devoted special notice, had always been a subject of interest. The description M. Lessar had given of it exactly corresponded with the account which he had himself derived from Persian and Arabic authors. At the same time, he could not agree with M. Lessar in limiting the application of the term of Badghis to merely the valley of the Kushk, that is, to the eastern and fertile portion of the district, for the Arab geographers, the great authorities whom all scholars followed, had given very copious descriptions of Badghis, both in its desert and its fertile character. They enumerated, for instance, ten or twelve places of habitation in the country, and out of the whole list there were only two or three which were credited with running water. All the others were said to derive their supply of water from wells and underground aqueducts. That was the distinguishing physical feature of Northern and Western Badghis, and it exactly answered the description which M. Lessar, from personal observation, first gave of it, and which was confirmed by Sir Peter Lumaden's party, who were now surveying the district. The eastern and southern portions of the country along the slopes of the Paropamisus range and along the Kushk river, were, on the contrary, exceptionally fertile. It was that particular region which was extravagantly extolled by Oriental writers as being in the spring a flower-garden of beauty and a treasure-house of delights. They stated specifically that Badghis was the only country in the East which could supply a thousand different encampments for an army—a thousand valleys, in each of which a camp might be pitched, perfectly well supplied with fuel,

fodder, grass, and water, and they added that such a state of things could not be found in any other region in the East with which they were acquainted; in fact, the rich herbage, luxuriant pastures, and forests of pistachio-trees of Badghis were celebrated throughout the world. Without attempting to enter at any length upon the ancient history of the country, he would now say a few words on the subject which really were of some interest. With that fondness for punning etymology for which they were famous, the Persians pretended that Badghis owed its name to the gales of wind that were prevalent there, the word meaning "raising a hurricane," but this derivation was only partly true. There was an important Pehlevi work not very much known, which was a most valuable repertory of the old traditions of the country; it was called the *Bundebersh*, and was certainly compiled before the Arab conquest—probably in the fourth or fifth century. It contained, moreover, especially curious notices of the districts of Khorassan. Now, it was there stated that Badghis derived its name from the tribe or colony called the *Vad-Keshan*, which meant "wind-worshippers," and as it was known from the coins of the Kushan or Tokhari that those tribes did worship the wind, it might well be supposed that that was the true derivation of the word. The tribes in question were commonly called *White Huns*, and came into the country before the fourth or fifth century of Christ. Their capital was *Tálikán*, about 30 or 40 miles east of the modern *Maruchak*, and Badghis was their strong place. Oriental geographers always connected Badghis with *Baghsbur* or *Bag-esbwar*, which was the capital of that division of the country and is represented by the modern *Kileh-Maur*. Further south, near *Gulrán*, was *Dahistán*, the country of the *Dabæ*. He believed that name was now entirely lost in the country. The governor was said to have lived in another city called *Kughanabád*, but there was no clue to its site.—He would now attempt to identify some of the places that had been visited by *M. Lessar*, and the officers serving with the British Commission. *Kara Tepeh* was the ancient *Bavan* or *Baban*, the capital of *Ganj Rusták*, which was the south-eastern portion of Badghis. The measurement from *Herat* proved its identity. Then *Kileh-Maur* was *Baghsbur*. *Ak Tepeh* was, perhaps, the famous *Merv-er-rúd*,* which was only inferior to *Merv*, and the modern *Maruchak* seemed to answer to the *Marsak* of the geographers, which was half-way between *Merv-er-rúd* and *Abshín*. This latter place, now called *Bala Murghab*, was the capital of one of the most interesting principalities in all Oriental history. The principality was named *Gharshistan*, and was governed by a family that had the title of *Shar*. The *Shars* of *Gharshistan* were one of the most famous historical groups in antiquity. The king lived in the city of *Bala-Murghab* or *Abshín*, and his people not only obtained very great power, but reached an extraordinary degree of civilisation. When the Arabs first became acquainted with them they were astonished to find in the middle of what they supposed to be a barbarous mass of mountains a higher state of learning and civilisation than they had left at *Baghdad*. The *Shar Abu Nasr*, indeed, who died at *Ghazni* in A.H. 401, was notoriously one of the best Arabic scholars of the age. The whole story of *Gharshistan* was so curious that fifty years ago *M. de Sacy* wrote a special memoir upon it, which was to be found in the first volume of the '*Mines de l'Orient*.' At that time the site of the place even was unknown, and it attracted but little notice, but now, fifty years afterwards, the British Frontier Com-

* The exact position of *Merv-er-rúd* is still undecided. Sir *P. Lumsden's* officers suggest *Bala Murghab* or the immediate neighbourhood, but that is impossible. *Merv-er-rúd* was certainly close to *Penjdeh*, and to the south, I think, rather than to the north. I should place it about five miles lower down the river than *Band-i-Nadir*, but must reserve my arguments for a special paper on the subject.—H. C. R.

mission actually had its winter quarters on that very site, and were living around the old palace of the Shars.

He now proposed to say a few words about the Sariks. The character given of them by Major Holdich and other members of the Commission, was very different from that which had generally been attached to them, and which the Russian officers had especially brought to notice. M. Lessar recently repudiated the idea that it was the desire of the Russian Government to annex the Sariks of Penjdeh because they were of the same race as those of Yol-atan, who were already Russian subjects, but rather for the purpose of reclaiming them from brigandage, and he now explained that they had apparently altered their character since the Russian occupation of Merv. If this explanation were true, if in the course of a year the Sariks had felt the influence of Russian civilisation so much as to have entirely altered their character, it was a very remarkable ethnographical fact. From official documents he had hitherto always understood that the claim which Russia had put forward to the Sariks was founded on the fact that a division of the tribe had voluntarily tendered their allegiance, which on the ground of ethnographical unity required that all the divisions of the race should follow the same course; that is, that if the Sariks of Yol-atan were Russian subjects the Sariks of Penjdeh ought to be so also; but the faulty point in this argument was that the former voluntarily submitted, whilst the latter refused submission. If the Sariks of Penjdeh chose to submit to Russia they might have the privilege of doing so, but until they did make such an election they were entitled to remain on Afghan lands, and to be treated as Afghan subjects. He entirely repudiated the principle of ethnographical unity with regard to the Turkomans. Half of the Yemuts, for instance, belonged to Persia, while half were Russian: of the Ersari some were independent and some had proffered their allegiance to Bokhara: some of the Salors, again, the other day tendered their allegiance to Persia, whilst others were attached to Khiva. The Turkomans, indeed, extended as far as Constantinople: Asia Minor was full of Turkomans, and these latter were not recent emigrants but had been there for the last 500 years. Originally the Turkomans were a tribe which came from the east into Khorassan with the Seljukians, or before them. They were then called Ghuz. They overran Persia and spread into Syria and Asia Minor. Ultimately the greater part of them took to the desert between the Persian mountains and the north-eastern shores of the Caspian, and there they had remained until recent years. Their appearance in the southern part of the desert was comparatively recent. The Tekkes only came to Merv about thirty years ago, the Sariks at the same time moving from Merv to Penjdeh, where they had settled and paid tribute to Persia ever since. However, this was a digression and did not refer especially to the subject of discussion, so that he would not pursue it further.

The PRESIDENT asked Sir Henry Rawlinson if he would point out distinctly on the map what, according to his views, were the claims of Russia and what were those of Afghanistan?

Sir HENRY RAWLINSON said the general distribution of territory between the two Governments of Russia and England followed a certain political arrangement which was made in the year 1872, in virtue of a diplomatic correspondence between the two countries. That agreement drew the frontier of Afghanistan along the Oxus as far as Khoja Saleh, but from that point it gave no direct line, merely stating a general distinction between the Turkoman desert on one side and the hilly Persian districts on the other. Unfortunately it did not define the point at which the line would cross the Murghab, but the inference from the general distribution of hill and plain certainly placed Penjdeh in the southern or Afghan division. According to the same principle, the line would reach the Hari-rud somewhere about

Sarrakhs; in fact when the present negotiations were originated, for the purpose of defining the line and complementing the old arrangement, it was assumed by all parties, and especially by the Russian Foreign Office, that Sarrakhs was to be the western point of departure. He should say that the line ought to run from Sarrakhs or somewhere in the neighbourhood, and should be prolonged as directly as possible from that point to the Oxus at Khoja Saleh.

The PRESIDENT said that in the delightful travels of Major Abbott it was stated that he started from Herat to go to Merv, and had a profound distrust of the Governor of Herat. He was accompanied by a man whom he thought was a dangerous person, and when he got to Penjdeh he said to him, "I am now entering upon the territory of Khiva, leaving, in fact, the territory of Herat," and he sent him back again, to the man's intense disgust. If that were the territory of Khiva, would that fact tell on either side?

Sir HENRY RAWLINSON replied that it did not, because the notice referred to an exceptional period. At the time of Major Abbott's visit the Khan of Khiva had made an irruption into the country to the south, and for two or three years he exercised sovereignty over a considerable part of Afghan territory reaching as far as Kila-Maur. Immediately, however, the Khivans retired, the Afghans resumed possession. M. Lessar contested, it seemed, the application of the term Badghis to such a large extent of territory, but he could not agree with him. A most valuable authority, Hafiz Abrú, an accomplished minister of Shah Rukh, the son of the great Timour, who brought Badghis and Herat to its highest state of prosperity, had written in about A.H. 820 an elaborate history of Khorassan and Herat, treating his subject geographically, historically, and statistically. A copy of that manuscript was given to him (Sir Henry Rawlinson) forty years ago by Yar Mahommed Khan, the famous Vizier of Shah Kamran of Herat, and it was now in the British Museum. Hafiz Abrú distinctly described the boundaries of Badghis, stating that on the west it was bounded by the Persian districts of Jám and Sarrakhs, so that it must have extended from 'Kushan right up to Sarrakhs. He had read almost all the authorities from the time of the Arab conquest to the present day, but he had never met with any local authority who had attempted to confine Badghis to the south-eastern corner of the district after the fashion of M. Lessar. In all Oriental countries frontiers were elastic and fluctuating, but there was usually a recognised normal distribution, and he defied anybody to question that the normal distribution of territory in Badghis was to extend the frontier as far north as Sarrakhs, or at any rate between Pul-i-Khatun and Sarrakhs. If there was to be any fresh distribution it would be entirely a new departure, for which, as far as he could see, there was no political necessity. He felt convinced that if M. Lessar and himself were to sit down and argue the question on a purely geographical basis, they would agree as to the northern limits of Badghis, which were, in fact, the limits of Turkomania and Afghanistan. He was certain that the geographical evidence was so strong that any fair-minded man like M. Lessar could not resist it, but of course there might be questions of political expediency which overruled all other considerations, and upon that subject he would not presume to say anything.

Sir RICHARD TEMPLE said the subject was so much involved with political considerations that he could only venture to put one or two geographical questions. It would be very interesting if General Walker would kindly explain what Major Holdich meant by saying that Herat was "commanded on all sides." In a military sense the term meant that there were hills in the neighbourhood of the city upon which modern artillery could be placed. Would General Walker state how those hills were situated and what was their position in reference to the city? Perhaps if General Walker hesitated to do so, Sir Henry Rawlinson would kindly

explain it. He wished to bear his testimony in corroboration of what Sir Henry Rawlinson had said in his most interesting and practical remarks regarding the boundary. He was a member of the Government of India when that boundary was settled, and nothing could be more explicit than the understanding that it ran from Sarrakhs on one side to Khoja-Saleh on the Oxus, and that the line was to be drawn as straight as an arrow. He would like to know whether the important position Ak Tépeh was on the Afghan side of that line or not. He also wished to know what was the exact distance from the nearest point on that line between Sarrakhs and Khoja-Saleh and Herat. He had listened with great satisfaction to what Sir Henry Rawlinson had said regarding the boundaries of the old province of Badghis, and he presumed that according to Sir Henry the whole of that territory fell within the line, but it would be satisfactory if he would state so explicitly, especially as such an interesting description had been given of the fertility and resources of the district. He expressed his extreme satisfaction at finding that the political geography of that country was attracting so much public attention. He was himself a politician first and a geographer afterwards, and he hoped that all Englishmen were patriots above all things else; but a knowledge of accurate geography such as evidently was possessed by M. Lessar was more common in the Russian service than in the English service. It was Englishmen's ignorance regarding the lie of the ground, the relative positions of places, and the importance of certain lines of communication, which caused the apathy in respect to political consequences that frequently placed England at a great disadvantage. If the Geographical Society succeeded in disseminating information and in arousing public interest with regard to this matter it would achieve an important national purpose.

SIR HENRY RAWLINSON, in reply, said that forty years ago Herat was surveyed accurately, minutely, and scientifically, by a most accomplished officer of the Bengal Engineers, Major Sanders, who drew up an elaborate report upon it. Since then it had been examined by many other officers, Russians and French, such as General Ferrier, M. Khanikoff, General Grodekoff, &c., and they had all left it on record that there were two elevated positions to the north of Herat, called Tel-i-Banghi and Mosellá, which commanded the city, and they had all moreover agreed that unless outworks or detached forts were erected on those two spots, Herat was untenable against a European army, but that with those posts connected with the city, it was one of the strongest positions possible. When Major Holdich said it was "commanded on all sides," he presumed that was a mere *façon de parler*, because there was nothing, as far as he knew, on the southern side that dominated Herat in any way. The northern hills were not above the height of the top of the citadel, but they would enable an enemy to send a plunging fire into the city and especially into the cistern which contained the water necessary for the garrison. With regard to Badghis, the western boundary was certainly the Hari-rud, but the northern boundary was one of those doubtful matters which the Commission were supposed to have instructions to settle. Any line from Khoja Saleh to the neighbourhood of Sarrakhs, unless it made a great deflection to the south, would certainly include in Afghanistan the Salt Lake and all those pastures which it was now proposed to make over to the Turkomans, and it would further run considerably to the north of Ak Tépeh and Penjdeh and Pul-i-khishti, skirting the hills north of Maimanch to the Oxus. There was one other point which it might be as well to mention, because M. Lessar had attached some importance to it, and so long as it remained a standard article of belief it confused the subject very much. It was generally supposed that the present question of frontier depended very much on the extent of the country possessed by Dost Mahomed Khan and his successor Shere Ali. Such a reservation did govern the original agreement, but it was subsequently officially withdrawn by

Prince Gortschakoff, and there was no question of "*uti possidetis*" in the terms as finally agreed upon. The principle which it was decided should govern the distribution, was the distinction of hill and plain, or the boundaries of the "dependencies of Herat," and any court of law that had to examine the question would assuredly decide that Badghis from all antiquity had been a dependency of Herat, and as a dependency of Herat it undoubtedly came within the Afghan limit of territory.

In answer to a further question by Sir RICHARD TEMPLE as to how many miles it was from Penjdeh to Ak Tepeh; Sir HENRY RAWLINSON said the distance was five miles, and from Ak Tepeh to Pul-i-khishti was half a mile.

M. LESSAR then again addressed the meeting (speaking in French):—He thanked the President for the permission not to speak on political matters, and wished only to explain that his silence did not in any way mean his agreement with the political opinions expressed during the meeting. Returning once more to the character of the Sarika, he must say that his words were misunderstood; the Russians certainly do not boast of having in one year civilised the Turkomans. They claim to have pacified the desert, abolished the slave trade, and made it possible for the surrounding countries to live in peace. To this end it was necessary to subdue and chastise the Turkomans, and it is fear, and not the civilisation of their character, which produces this change in their conduct.

The PRESIDENT proposed a hearty vote of thanks to Major Holdich, and in doing so, said he thought they might depart from the usual plan and extend it to M. Lessar, who had kindly attended and added so much to the interest of the discussion, and to Sir Henry Rawlinson, who had so patiently submitted to the cross-fire from the chair and from Sir Richard Temple. It would be utterly presumptuous on his part if he were to attempt to speak authoritatively on any of these questions, but he must vindicate English geographers against the somewhat harsh judgment passed upon them by Sir Richard Temple. The Russian maps followed closely the map drawn by General Walker and his department, and it was only when the Russians came to close quarters with the country and saw that the boundary was one which would be inconvenient to both parties, that they thought it necessary to depart from it. The Russians had thus followed the English. But even if the best knowledge of the country had not been furnished by Englishmen, it must be remembered that the Russians had steadily advanced from west to east, clearing up all sorts of geographical problems as they went along; while between India and the territory was Afghanistan, jealous beyond measure of foreigners, and Englishmen for the most part had only been able to obtain information while attacking or defending Afghanistan. Still, up to the present time, our travellers had furnished the only existing authority for the map of that portion of Western Afghanistan.

The resolution was carried unanimously.

The Irawadi River. By ROBERT GORDON, C.E.

(Read at the Evening Meeting, March 9th, 1885.)

Maps, p. 352.

THE purely geographical question as to the sources of the Irawadi river takes an undue prominence in comparison with other questions of high practical import relating to the same regions. The peninsula of Indo-China is as compact and as well-defined an area as that of either India or China from which it has to borrow its name, but its peoples and

countries have not yet been grouped or welded together under a few distinct ideas which can enable the mind to seize and retain the principal characteristics and relations of the territories into which it is broken up, or of the nations occupying them. Occasionally some series of incidents, or some locality comes into view, under a vivid light, only to fall into obscurity when the transient interest aroused has passed away. Perhaps the fact that the whole peninsula is broken up into areas difficult of access from each other by high mountain ranges and rivers radiating south and south-eastwards from the neighbourhood of one spot, is in some measure accountable for this; for, although the population on the whole is as thoroughly homogeneous as that of China, political isolation follows the physical boundaries and intensifies the obstructions to intercourse and familiar knowledge of the interior. This, however, is hardly sufficient to explain the manner in which information of the most accurate and extensive kind, which has been placed on record and is still accessible, with regard to these countries, is dropped out of sight and ignored; and we sometimes have alleged discoveries of new facts which the means available might have made known long before. I now refer particularly to the vast storehouses of knowledge contained in the records of the civilised Eastern nations, especially upon geographical points, many of which have been placed at the disposal of western students by scholars of the highest ability. Had due weight been given, for instance, to such testimony as has long been open to us about the Irawadi river, a single paragraph of this paper would have sufficed to give information enough about its sources to identify them, and the paper might have discussed other matters of equal or higher interest.

Unfortunately, however, instead of each contributor to the discussion taking it up where it had been left by its predecessors, and treating it as though it had a history with a continuous sequence of evidence requiring the most careful consideration, the attention has often been too exclusively confined to a few facts, valuable in themselves, but insufficient to base conclusions upon affecting so wide a range of matter, and in apparent contradiction to very weighty testimony. In my Report on the Irawadi * I collected together all the evidence within my reach at the time. I was somewhat at a disadvantage, living in Burma, and had to either purchase from London, or borrow from Calcutta, most of the works I quoted, so that my references were imperfect in important particulars, which I am now in a position to supply; but, beyond the testimony of previous writers, I was able to add some information about the magnitude of the Irawadi itself, and to base upon the whole the inferences I arrived at. I find that those who take the opposite view as to the connection of the Irawadi with the Sanpo of Tibet, continue to treat the whole of the evidence unfavourable to them, as though it were non-existent; and bringing the weight of

* 'Report on the Irawadi River,' Rangoon, 1879-1880. . .

very high authority to bear upon the argument, summarily decide, and carry the geographical world with them, that the testimony adduced is unworthy of serious attention. I labour, therefore, under the very great disadvantage of being compelled to travel over the same ground, and recapitulate, with, I am afraid, wearisome results, some of the evidence and arguments I before brought forward. But as much new evidence, and older information which I was formerly ignorant of, have come to light, my task will be made easier, and this paper be more readable, if I summarise very briefly my previous conclusions, which can be referred to in my Report, and give with more detail some account of the new matter available.

Firstly, I will show that the Irawadi, where measured by myself in my official capacity as engineer in charge of the river works, for many years, at the head of its delta, is one of the largest rivers in the world, as regards capacity and volume. Then following its course upwards, evidence will be cited to prove that at Mandalay, above all its principal affluents, it is still an enormous river; and, going still further up, to above Bhamo and to where it is first known to western geographers, and usually shown by them as an insignificant mountain stream, it is still one of the largest rivers in the world, still containing probably two-thirds of its volume in the delta, where the remaining third has been collected from over 150,000 square miles of its valley in Burma. Some collateral evidence as to its size is derived from the local names of the river.

Secondly, turning to the Sanpo in Tibet, direct evidence is derived from the Chinese geographical annals extending over twelve hundred years, and corroborated by the direct statements of French missionaries and others, that the Sanpo is the Irawadi; and indirect evidence is deduced from other statements of French missionaries and of the surveyors sent out from India, to the same effect, which is further corroborated by the Chinese maps, and by collateral evidence as to the names of the rivers.

Thirdly and lastly, evidence from the Assam side will show that no influent of the Brahmaputra can possibly bring the Sanpo to it; and further testimony derived from the names of the rivers and the statements of the peoples in the neighbourhood will be adduced to show the extreme probability of the great river of Tibet being the upper part of the great river of Burma. The whole of these lines of argument converge toward one spot, the same centre from which the mountains and rivers of Indo-China may be said to radiate, and which has so far been found to be impracticable to cross by explorers, whether Native or European, though it is within a short journey from British territory, and where irrefragable proof as to the existence of the great connecting link between the two rivers can be obtained.

Now it is quite possible that the whole of this evidence may be inconclusive or untrustworthy; and indeed, it must be so if the Sanpo

flows into the Brahmaputra instead of into the Irawadi; but it is derived from the most varied sources, most or all of them of an unimpeachable kind, and in some cases of the very highest authority; and the greater part of it has been in existence for very many years, and within easy reach for verification or rejection. Yet it has been systematically treated as of less than no account, and it is only fair that those who have so ignored it should explain their reasons for this. I will now proceed with a statement of the evidence, and shall give in footnotes to the pages references to other writers, so that comparison and verification can always be made; and, as far as possible, when giving the substance of an author's statement, I shall work into the text such of the original words as will best express the meaning in a concise form.

On the east of the Bay of Bengal three rivers enter the sea, side by side: the most eastern one, the Salween, with an insignificant delta; the centre one, the Sittang, with a large negative delta, funnel-shaped, up which the tide rushes with a tremendous bore; and the Irawadi with a delta some 150 miles wide and ten mouths through which, in floods, its muddy waters find their way to the sea. The Salween, though so modest, is one of the most remarkable rivers in the world, with a history extending over nearly 4000 years, and a course of probably between 3000 and 4000 miles. It is mentioned in the Yu King of China, 2200 B.C., as the Black river, issuing from the Black Lake of Tibet, where it has already had a long course from the northern Himalayas through the high plains of the great lake region as the Targot, or Shyal-Chu river; and it successively takes the names of Nag-chu-kha, or Black river, of Lu-chu, and of Nuchu, and finally emerges from the plateau in about latitude 26° N., as the Salween. It thus keeps the northern Himalayas upon its right the whole way till it reaches the sea, and this range continues without a break from its junction with the Kuen-lun and Himalayas proper, gradually diminishing in height from peaks of over 25,000 feet to passes at 16,000 in latitude 29°, and finally disappearing between Rangoon and Maulmain. This statement is based on those of the Imperial Geography of China, on a description of the rivers of China, published in 1770, which traces the Salween from the Kuen-lun near Mount Kailas, or Gangdisri, and from Nain Singh's journey of 1873, described in this Society's Journal for 1877, when he found that this river came from the extreme west of the plateau, in longitude 83°. When I wrote my report in 1877 the Salween was summarily cut short about latitude 28°, like the Irawadi in most maps, and some geographers liberally gave portions of its head-waters to the latter river; but as it now seems generally allowed that the Salween does rise from beyond latitude 30°, and thus cuts off all possible

* Copy in British Museum of 1744; and translation of edition of 1775 by Klaproth in '*Magasin Asiatique*,' vol. ii. p. 269; and Description of the Rivers of China (Shui-tao Tikang), 1776, in British Museum. See also account of Nain Singh's journey, Journal R. G. S., 1877.

sources of supply to the Irawadi from the Tibetan plateau, except the Sanpo, the Ken-pon, and the Zayal-chu, the long investigation I was then compelled to make to prove this may now be dispensed with, and I think it may be taken for granted by all that this arrangement of the Salween and the boundary mountains simplifies the point at issue, and reduces the question to whether the above-named rivers flow into the Irawadi or not.

To begin with the Irawadi river as known in the delta. I have mentioned that its sea front extends over some 150 miles with nine or ten mouths distributed over the space. The great body of the water, however, passes down by two or three of these on the east of the centre, but still large portions find their way by the arms forming the sea-ports of Bassein on the west, and Rangoon on the east. Each of these cities is really on an estuary of the sea, and owes its immunity from being silted up by deposits from the Irawadi to the fact that so little of the flood waters passes there. All the intermediate mouths have bars with but a few feet of water upon them, and shoals constantly form to ultimately become dry land, or to be washed away by sea-currents. The highest point of the river at which any of its water can leave its main channel and flow by other courses to the sea is at a place called Talok-moh, so named because a Chinese army halted here after defeating the Burmese king, and overrunning the empire. This place is situated about 150 miles from the coast, but the plains extend some 50 miles higher to Prome, where formerly it is said a branch left the river.

Time will not permit information which might be of interest regarding the delta and the rest of the country to be given, and I must confine myself to mentioning that while there are here about 12,000 square miles of exceedingly rich plain land, in itself highly suitable for rice cultivation, by far the greater and most valuable part of it was formerly always subject to inundation during floods every year, making it worthless, though it is covered throughout with dense forest, the haunt of mosquitos, as well as of tigers and elephants and other big game.

Amongst other works to improve this country, a series of protective embankments running along the river banks was commenced in 1863 and has progressed so far that now over 2000 square miles are thoroughly protected and being rapidly brought under cultivation. In 1867 it was proposed to embank both sides of the main channel, and as this operation is supposed to be attended with risk, the Government of India ordered in 1868 that a thorough investigation should be made into the whole question of the floods of the river, with its capacity between the embankments, in order to ascertain which it was necessary to make observations for discharge at varying heights of the water, so as to get the best possible approximation to the whole volume of water passing down in all possible states. A few isolated measurements had been

made in previous years by various officers, but it was not till 1872 that the preliminary operations were completed and systematic observations were made. These were carried on for nearly every day except Sundays from 1st August 1872 to 1st August 1873, near Talok-moh, where all the water was in one channel, and check measurements were made about 110 miles lower down on the main channel and on the Bassein channel.

Similar observations were repeated in 1875, and again in 1878, on an extent and with a degree of elaboration unknown before, and the results of these measurements and surveys of the delta, together with a somewhat extensive investigation into the history and attendant conditions of the river floods and their effects, were submitted to the Government in a series of Reports. The instrument used for measuring the volume of the water was the double float, consisting of a wooden cylinder one foot long and six inches diameter, ballasted with clay to sink to any required position, where it was held by a very fine cord of given length attached to a light float six inches diameter and one inch thick. This is a most convenient instrument for handling and for observation, but in rapid rivers of great depth it is not as accurate as is desired.

In 1882 check experiments with an electric meter proved that some corrections should be introduced into the results for floods, and I have made these for the monthly totals of the years 1872-1879, and would beg to offer them to the Society in tabular form as well as in a diagram. The amount of silt carried by the waters was also carefully measured, and the corrected monthly averages of this are also given.

The average discharge for the year is about 521,794 millions of cubic yards, very nearly four-fifths of that of the Mississippi river. But while this discharges pretty evenly on the average all the year round, the Irawadi sends down three-fourths of its total in the three months July, August, and September, or, in other words, its monthly flood average is more than twice as great as that of the Mississippi, which drains over one million and a quarter square miles of country. The extreme flood discharge of the Irawadi for one day was at the rate of nearly 2,000,000 cubic feet per second in 1877, and the lowest known discharge occurred in the same year, and may be given in round figures as 50,000 cubic feet per second, or one-fortieth of the flood discharge. The highest flood discharge in one day is 50 per cent. greater than that of the Mississippi, and double that of any river in Europe. The figures just given may be noted, together with the average ratios of the discharges for the different months, as they afford a key to the enigma of the river's sources. Thus August has usually 22 per cent. of the whole discharge; while the six months December to May get altogether only 13 per cent., of which December and May have each 3, January and April 2, and February and March $1\frac{1}{2}$ per cent. Again, the variations from year to year are worth observing. In 1877 the dry season discharge was extremely

THE IRAWADI RIVER.

TABLE I.
THE DISCHARGE OF THE IRAWADI RIVER IN THOUSANDS OF CUBIC YARDS FOR THE PERIOD 1869-1879.

Year.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Total Mean Yearly Discharge in Cubic Yards.
1869	..	..	..	..	..	40,825,938	89,480,284	97,860,120	84,681,412	79,561,046	17,126,137	..	..
1870	..	7,011,620	6,177,903	7,459,966	9,796,097	28,132,333	97,769,197	110,257,942	102,850,440	53,196,644	32,453,057	16,780,772	..
1871	10,374,715	6,861,491	8,853,546	12,215,938	15,203,636	53,428,134	104,743,809	120,278,953	111,188,885	68,708,633	43,204,918	20,338,999	..
1872	12,263,711	8,892,766	8,125,806	8,526,442	18,331,328	24,764,475	100,695,330	111,312,908	91,537,166	96,433,114	38,749,049	19,894,435	..
1873	12,610,245	8,716,321	8,457,532	8,626,025	11,332,012	43,746,566	89,311,375	100,179,588	74,179,558	61,525,228	31,769,533	14,144,040	..
1874	8,772,566	6,284,501	8,507,299	13,959,980	23,661,337	28,026,523	86,197,043	83,026,341	88,661,265	75,910,071	31,387,317	15,418,418	..
1875	10,277,332	7,243,315	7,963,091	14,366,272	28,271,573	53,064,618	110,688,917	128,911,002	98,641,795	56,775,476	23,231,280	13,832,671	..
1876	8,714,449	6,102,617	8,071,610	11,777,703	12,806,741	32,829,534	104,735,806	116,263,748	62,658,620	64,199,992	22,997,391	13,443,382	..
1877	7,819,245	5,839,402	5,449,926	10,536,542	9,339,366	37,149,823	78,733,705	144,329,639	101,845,692	99,250,469	35,668,172	18,557,736	..
1878	12,231,336	8,265,343	11,418,328	13,959,866	14,187,933	20,960,022	96,473,180	114,221,992	109,738,438	96,803,820	37,366,733	19,45	..
1879	12,328,135	8,786,929	9,513,465	8,628,367	12,374,334	73,306,094	126,443,099	130,277,362	118,496,642	65,596,062	38,187,266	17,019,954	..
Monthly Discharge.	10,683,554	7,400,733	8,263,840	11,006,611	15,649,435	39,665,814	97,761,067	114,263,620	94,951,827	74,544,597	30,920,804	16,893,071	621,793,852,000
Ratio of Monthly to Total Discharge..	2.00	1.42	1.59	2.11	3.01	7.68	18.74	21.89	19.19	14.29	6.93	3.24	per cent.
Quantities of Silt carried in Tons weight....	2,369,932	1,116,057	1,271,811	3,199,462	7,098,684	21,595,707	51,492,720	69,729,168	60,272,611	35,619,659	11,314,917	6,330,328	261,301,283 tons.

* This month is included with the others, January-May.

low, falling to two-thirds of the average; while the flood seasons of 1875, 1877, and 1879 were unusually heavy, and that of 1874 very light.

The science of comparative hydrography is still in its infancy, but it has a sturdy ancestry, and a vigorous and useful existence may be predicted for it. It will be of great assistance to geography in its widest sense, as it undertakes to place on record the relations existing between the humidity of the atmosphere and the earth's surface in the various water-systems. All over the world individual rivers have been studied for many years, not only with reference to the fluctuations of their water surfaces, but as to the geological and atmospheric conditions of each river or basin helping to make up the whole watershed. The preliminary work for these studies is of such an extensive and elaborate kind, requiring co-ordination over areas so extensive, that only governmental authorities have been able to conduct them; but the results have so far been a series of magnificent monographs of a highly specialised kind in several different languages. Some progress has also been made in comparing the elementary data and principles; but we have yet to look forward for such systematic and comparative studies as will insure a uniform symbolism and notation applied to the records of the different river systems, so that a telegraphic summary of their relations to the atmosphere over extensive areas in all parts of the globe can be furnished daily through every newspaper willing to publish it. This would give, in a short space, a fair indication of each season's progress over each river basin recorded. For it is evident that the discharge of a river at any fixed point is a rough measure of the hygrometrical condition of its valley above it; and if gaugings were daily recorded near the mouth of each important influent, and the geological nature of its strata known, the fluctuations of the water would supply valuable inferential information as to the average state of the atmosphere. Combined with the records of the usual meteorological instruments, the information furnished would be complete, as the one set of data would specialise, the other summarise naturally the results. If, for instance, we were able to consult the records of the flow of the influents of each river of Great Britain for some years, our knowledge of the climate would be grouped in more convenient forms for reference than it can be by rain-gauge records alone. And, similarly, even without the latter data, the record for a series of years of the discharges of the great rivers issuing from the plateaus of Asia, and within the domain of the monsoon, such as the rivers of Yarkund, of the Pamir, the Indus and the Ganges, the Brahmaputra, the Irawadi, and the Salween, and the other rivers of Indo-China and of China, would enable us to get an insight into many of the circumstances attendant on the seasons of drought or of flood, so disastrous to the peoples of the surrounding nations. For we know, from scattered but trustworthy

testimony, that closely allied conditions prevail over the whole of this immense region; and where great differences persist between the various river systems, the different conditions of climate and of position can be assigned with some precision; while transient variations can thus be made to stand out in relief and their causes ascertained. The Government of India has already inaugurated a system of recording such river observations throughout the Empire, and I would hope that this Society might use its influence to extend these records over the whole region under consideration; and I must make this hope the excuse for the short digression.

The science already furnishes fixed principles and practical methods by which comparisons may be made between rivers and river basins in analogous and contiguous situations, and first amongst these is the system of complete discharge measurements for a series of years similar to that carried out in the Irawadi delta. Failing these, however, isolated measurements for discharge are of value, or even of the dimensions of the channel of the river, when this is of a uniform and regular shape, with a long reach in straight lines or easy curves and moderate surface full. Then, if it is known that at high floods the river is still navigable, and the rise from low to high water be given, a measurement too often neglected by travellers but which is indispensable for knowing the discharge, these data will give an approximation to the ordinary or highest flood discharges. This normal flood capacity of a river is the only one that can be relied on in making comparisons, as the shape and dimensions of the channel are moulded and given a permanent character by the higher discharges and not by the lower ones, which are liable to vary incessantly, and from slight causes of which there can be no record and may be no knowledge. An example of what is meant by this will presently be adduced from the measurements made on the Brahmaputra river. Meantime, my purpose is to point out that while I rely exclusively on a comparison of the flood capacities of the several river channels under consideration, in order to arrive at the extent of the rainfall gathering grounds or basins, and base my hydrographic conclusions concerning the Irawadi on the results; all the advocates of the Sanpo-Brahmaputra theory take exactly the opposite view, and, since Wilcox's time, reject the flood capacities, using only isolated measurements and approximate calculations of the minimum discharge to arrive at their conclusions. I may add that throughout a pretty extensive study of treatises bearing on the subject by American, German, French, Italian, and Dutch authors, I do not remember meeting with any other instances of such use of the minimum discharges, which are of the highest value only in questions connected with water-supply for irrigation, &c.

These remarks bring me at once to the very important series of data furnished by Colonel Yule regarding the Irawadi in its mid-portion near Mandalay. He confirms the accounts given by previous travellers of its

magnitude in flood. Thus Crawford said,* "From Wet-ma-sut to this place . . . (Silleh Myo) the Irawadi has a great breadth. In some situations to all appearances it was not less than four miles across." Again, "From the town of Ava to its debouchment the Irawadi receives no tributary streams of the least importance, except the Kyendwin, which is much inferior in size to the Irawadi." He also mentions the Myit-gney, which enters the river below Ava, and describes it as only 150 yards broad near its mouth. Now the Kyendwin basin occupies nearly 40,000 square miles, and the Myit-gney some 14,000 square miles of the Burmese basin of the Irawadi, so that we have here important elements for appreciating the size of the greater river. Colonel Yule's account of the river in flood, on 24th August, 1855, says,† "The river was unusually wide, scarcely less than five miles in places, but much of this appeared due to a shallow spread of inundation." They could not distinguish the junction of the Kyendwin. In an appendix to his great work, which is still the principal authority on the middle Irawadi and the country of Upper Burma, and a permanent record of the highest value, Colonel Yule discusses the sources of the Irawadi, formally rejecting the flood capacity of the river as a means of analysis; but giving Lieut. Heathcote's measurement of the river on 10th October, from which it is easy to compute the flood capacity. Its width was 3400 feet, with a rise and fall of 40 feet between low and high water, and a cross-section to the top of the bank of about 133,800 square feet. The measurement was made at a point above the Myit-gney and Kyendwin mouths, and was actually above more than two-thirds of the drainage area of the whole of the Burmese basin. No account is taken in Heathcote's manuscript drawing of the flood waters rising above the banks, and which his maps show could and must have spread over a width of several miles of low plain, over which the water flows in all high floods; but making allowance for this, I find that the Irawadi's capacity at that point would be in round numbers about 900,000 cubic feet per second for ordinary high water, and 1,200,000 cubic feet per second for extreme high floods. These results are confirmed by a measurement of the river at Bhamo, where Captain Rees, of the Irawadi Flotilla Company, found the river, where contained in a single channel a few miles above the town, to be some 9000 feet wide, with a rise and fall of between 22 and 23 feet, and where, although Bhamo is 200 miles higher up the river than Mandalay, its extreme high flood would still be above 1,200,000 cubic feet per second. This is due to the fact that between Mandalay and Bhamo the river is closely confined by neighbouring hills, which throw the rainfall into side tributaries; the only influent of any importance in that distance being the Shwey-lee on the east, which, with a course of several hundred miles, has some 7000 square miles of

* 'Journal of Embassy of Ava,' i. pp. 103-106; ii. 228.

† 'Narrative of Mission to Ava' (official edition), 1856, p. 63.

basin; but its discharge cannot exceed some 40,000 cubic feet per second in flood; while the Taping and Mogoung rivers, which form the only other tributaries of large size for some 150 miles above Bhamo, cannot give more than some 60,000 cubic feet per second from their basins of 4000 and 7000 square miles respectively. That is, if the given dimensions of their channels can be taken as criteria; and as for the Taping, I have been up it in extreme high flood, both in the Burmese plains and in the Shan valleys and mountains, and can confirm this estimate.

The magnitude of the Irawadi above Mandalay and above Bhamo has caused astonishment to every visitor whose ideas were formed from Western maps. Thus, Captain Hannay, in December 1835, records of this part of the river, "To this point no diminution in the volume of the Irawadi was perceptible, from which we may infer that all the principal feeder affluents which pour tributary streams into the Irawadi were still further north, and had not yet been reached." He showed that the Shwey-lee was not over 200 yards wide at its junction. Then, at the Mogoung river, lat. 25°, the highest of these tributaries, he says, "Before leaving the Irawadi [in December], I could not help contrasting its size with that of the Mogoung river, the mouth of the latter being hardly visible from the opposite side of the Irawadi, which is still a fine river flowing in a reach from the eastward half a mile broad. The water is very clear and the current runs at the rate of two miles an hour. The depth varies from three fathoms in the middle to two fathoms at the edge of the river, but the banks, which are high and composed of alluvial soil, have every appearance of being overflowed in the freshes." Here the value of the ratios of the discharge table come in; as we can see that only 3 per cent. of the water comes down in December. I personally spent the flood season of 1868 in the upper part of the Irawadi beyond Mandalay, and in the Taping valley, and can vouch by this, and by inquiries repeated for many years, that the Upper Irawadi closely resembles, in its flood rises and continuance, the river in the delta, so that the impression as to the greatness of the river at this point can be established. Dr. Griffiths, whose high value as a scientific observer is on record, saw the Irawadi at the same place in April 1837. He had just come from Assam. He says, "The Mogoung river at its mouth is about 70 yards across. The Irawadi . . . keeps up its magnificent character. At this point it is 900 or 1000 yards across; and, when we reached it, it had risen considerably, and the appearance of this vast sheet of water was really grand. Its characters are very different from those of the Ganges or Brahmaputra, its waters being much more confined to one bed. . . . The number of tributaries, even to Rangoon, is unprecedentedly small; this tends to increase the astonishment with which one regards this magnificent river. . . . On the whole it is, I think, probable that the Irawadi is an outlet from some great river, which drains an extensive tract of country."

An Austrian expedition under Count Szechenyi passed through Tibet and Burma in 1880. Lieut. Kreitner, one of the number, has published an account of this in Petermann's 'Mittheilungen' in 1881, and says, p. 246:—"The sources of the Irawadi must, from a comparison of its discharge at Bamo with that of the Brahmaputra at Sudiya, lie in much higher latitudes than has hitherto been accepted. If, indeed, the Irawadi is not identical with the Sanpo, they must lie far in the north of the Tibetan Plateau. We saw the valley of the mighty ('mächtigen Stromes') Irawadi for the first time as we descended from the wooded plateau to the north of the Taping. The river has a breadth of six miles at Bamo, owing to many sandbanks which stand above the flood waters as islands, and it is so deep that the Irawadi Flotilla steamers regularly navigate it.

"The Irawadi is the greatest geographical problem in the whole of Asia. Where are its sources? What are the conditions of its upper and *middle* course? The nearer we approached to its neighbourhood the more my interest in these questions increased. Whenever I had an opportunity I inquired concerning its course. Almost all the Tibetans who could furnish information about this country, gave as an answer to my question, Where does this river come from? *From Lassa.*

According to Chinese and Tibetan sources the Irawadi is no other than the lower course of the Tibetan Sanpo."

I have given these extracts at length, as I believe they express the views of every person, without exception, who has seen this great river above Bhamo, some 800 miles from the sea. I must refer also to the able paper of Dr. Anderson in vol. xiv. of the Society's 'Proceedings,' who endorses that statement, but who derives the Irawadi from what we now know to be the head-waters of the Salween. He points out truly enough that although the Irawadi is constricted in its defiles to very narrow breadths, the river is none the less enormous, as its depth increases, and the body of water flowing there during the rains must be very great and its velocity and power tremendous. I must also refer to Major Sandeman's paper, and my own notes * on the Surveyor Alaga's exploration of the Upper Irawadi, for the dimensions of the river up to the furthest point reached of which we have exact knowledge. In latitude 25° 45' he found that the river was formed of two branches, the smaller of which he crossed and found it to vary from 100 to 300 paces in width; while he saw the larger branch from a hill distant five miles and judged it to be over 500 paces or 1300 feet wide. Down this branch came enormous bodies of water, causing all the great floods of the lower river. The combined river where he saw it at Waingmau was a mile wide, with a rise and fall of 25 feet. This would give a flood discharge of over 1,000,000 cubic feet per second, thus agreeing with the Mandalay and Bhamo estimates. Now the problem connected with the sources of the

* 'Proceedings R. G. S.,' vol. iv. 1882.

Irawadi is this:—We have here an exceedingly large river, certified to by independent testimony from various sources, all of the highest class, and all agreeing,* appearing in many maps with almost no gathering ground for its waters; for though Rennell and Griffiths and Anderson have given some Tibetan rivers to the Irawadi, these have since been proved to belong to the Salween, or to be cut off by it; and some of the smaller streams, like the Ken-pou and Zayal-chu, are now also cut off from it by General Walker; so that the latest official maps, in accordance with the large majority of western geographers, only assign to the Irawadi above latitude 26° from 5000 to 8000 square miles, and the difficulty is, if the Sanpo does not feed the Irawadi, to account for the supply of its enormous discharge. Now it would be well to realise what the Irawadi really is at this point. It is a greater river than the Danube, or any river of Europe. It is greater than the Yang-tse-kiang above the lake near Hankow. It is probably greater than either the Brahmaputra or the Ganges at their greatest. It is certainly much larger than the St. Lawrence at Montreal; and it is about equal to the Mississippi at St. Louis, where it has received the Missouri.

The names given to its branches by the neighbouring peoples all confirm this account of its size. Thus the Burmese appellations are Myit-gyee and Myit-gney, or Great river and Little river. The Mishmi terms Malee-kha, and Meh-kha are identical with the former. The Burmese rarely use the word Myit, and only give it to the largest of their rivers; they only apply it to two of the other tributaries of the Irawadi, the Kyen-dwin, and Myit-gney near Ava; and though, as Dr. Buchanan points out, most of the other tributaries are larger than the Thames, they use a distinctive word, "Choung," or stream, for everything with less than 12,000 to 15,000 square miles of basin. Therefore, if names are of any value, the term Myit-gney, or little river, means that this small branch is what we should call in England a very big river indeed, about the size of the Thames, the Severn, and the Trent together; so that when we come by contrast to the larger branch, the Great River, we ought to expect something very considerable. The 5000 to 8000 square miles of our atlases, and of Major Sandeman's and General Walker's maps, look very small. I intend to base a strong argument on the names of these rivers before I finish my paper; and would now only ask you to remember carefully that in addition to these Burmese and Mishmi appellations, the branches are known to the Shans who occupy its borders in this part by the distinctive names of Nam Kiu, and Nam Kiu Long; where Nam means river, Long great; and Kiu is the name word, making the greater branch the Great KIU River.

The Irawadi valley south of lat. 26° contains some 160,000 to 170,000 square miles; the drainage from this supplies it at the delta

* Even Wilcox, who is against the Sanpo-Irawadi connection, testifies to the existence here of the Great branch of the river to the east of the one he explored.

with only about one-third of its total volume, the rest being found in its channel where first we know it. How is this quantity furnished? I answer in Griffith's words, "by some great river draining an extensive tract of country." This country is, of necessity, in the Tibetan plateau, and for some four or five years, while working at my Report on the Irawadi, I accepted the explanation of Rennell and others, that one or more of the more eastern of the rivers shown in that part must bring the supply, since the Sanpo was given to the Brahmaputra. It was only after discovering that proofs exist to identify the Salween through its whole course, and taking in the most western of these rivers, that I was compelled to revert to the statements of Klaproth, of D'Anville, and the Chinese, that the Sanpo is the Irawadi. No other gathering ground remains in the plateau; and further examination has convinced me that this explanation harmonises all the difficulties; while turning the Sanpo into the Brahmaputra is in contradiction with all the existing testimony whether hydrographical or geographical.

At the very outset the difficulty concerning the great volume of the Irawadi where it is first known, meets those who support the latter theory. Here is one of the largest rivers in the world, with numerous influents whose basins range up to 40,000 square miles of country, and none of them approaching in volume this immense mass of water, yet we are told that 5000 to 8000 square miles of this particular neighbourhood can and do furnish its discharge. Now, as I pointed out in my Report, we know the rainfall of Munipoor to be under 50 inches per annum, and this country lies directly in the path of the monsoon rainclouds going to this part of the Irawadi valley. Further, the basins of the Mogoung (7000), the Taping (4000), and the Shueylee (7000), are immediately contiguous and in exactly analogous conditions as to climate, rainfall, physical structure of country, and in all probability geological formation, and they are, each and all, absolutely insignificant in comparison with the main stream; and Charrapoonjee, which, with its 600 inches per annum, is sometimes cited to show what a rainfall might possibly reach the Irawadi, lies, not on the approach to the latter, but on the monsoon path to the Brahmaputra.

I will now turn to the testimony from the Tibetan side. I should have been glad to have given some data about the Sanpo and other rivers, but the necessity of going into detail on other points of evidence leaves no time for this. I will therefore bring forward the Chinese maps and statements, corroborated by D'Anville's maps and the statements of the French missionaries to the effect that the Sanpo is the Irawadi; and then I shall add indirect testimony from the Abbé Desgodins, and from the statements of the explorers of the Survey of India, to strengthen those statements. As these last witnesses are supposed to be unfavourable to the Sanpo-Irawadi connection, their evidence will be the more valuable.

It is well known to those who have studied the writings of the East, that geography has long been a favourite science both with the Chinese and with the civilised natives of India. Not only have they possessed treatises containing most detailed information regarding the more distant provinces of China, or of Hindostan, but the intermediate ground of the plateau of Tibet, with its mountains and rivers, has been fairly well known to both sets of people; probably in the first place to the Hindoos and Buddhists, who both place Mount Meru, the earthly paradise, and the centre of the universe, on the plateau, and who seem familiar in the Mahabharata and the Puranas with the three great mountain ranges of the Kuen-lun, the Northern Himalayas, and the Himalayas proper; and afterwards to the Chinese, who, in the seventh century A.D., brought the Tibetans into subjection to the empire. Earlier than this, however, in the Yu King, which dates from 2200 B.C., they showed accurate knowledge of the sources of the Hoang-ho in the plateau, and at that time were on friendly relations with peoples in that region. Before quoting extracts from the 'Geographical Annals of the Chinese,' most or all of which are to be found in Klaproth's Memoirs in the 'Magasin Asiatique,' and 'Mémoires relatifs à l'Asie,' of 1825 and 1828, I must mention that as Klaproth's accuracy has been called in question in this Society, I have been very kindly aided by Prof. Robert K. Douglas, of the British Museum, in verifying the translations made. They are in every case careful and loyal renderings of the original Chinese. The large Chinese map of Kian-loung's reign, about 1770, belonging to the India Office, which, by the kindness of Mr. Trelawney Saunders, I am now able to show, has Manchou legends near the rivers of Tibet, also given by Klaproth. Dr. Wenzel, of Oxford, has retranslated them for me; and here also Klaproth's translations are exact and faithful renderings of the original. A later map, dating about 1863 (?), was lent me by Prof. de Lacouperie, of University College, and he has translated the Chinese legends and names of the country we are considering.

Perhaps I had better dispose of the maps first:—Although the Eastern geographers possessed a knowledge of the countries around them far exceeding that of the *œcumene* or known world of our ancient geographers before Christ, that knowledge was stored up in a most inconvenient form, and mostly consisted of mere enumerations of exceedingly long lists of mountains and rivers, and places and peoples, without any attempts at generalisation. The Chinese had maps 4000 years ago; but they were of the crudest kind, and probably would still have been so had not the great Emperor Kang-hi, who reigned from 1662 to 1723, got the French missionaries then in China to carry out a regular survey of the empire, which was done between the years 1708 and 1718. Tibet was not included in this survey; but Lama surveyors were specially trained to observe and gather information about the whole of the countries subject to Lassa. The pre-existing maps could not be

utilised; but the results of the surveyor's work, verified and extended by numerous other sources of information, were embodied in a series of maps, copies of which were sent to Paris, and used by D'Anville in the maps for Du Halde's great work on China. The originals were kept in Peking, and from these, from time to time, new editions of the maps are prepared, with corrections and additions. There are also small maps of districts issued with such works as 'The Description of Tibet,' published in 1792, which still retain a certain disregard of parallels and meridians; but the larger and official maps mostly retain the original meridians starting from Peking.

Now whether we take D'Anville's map, or the imperial map of Kian-loung, or the official map of 1863, or indeed any of the other more crudely sketched maps, we find a general agreement about the positions and directions of the mountain ranges and rivers of Tibet; with, it is true, minor discordances and inexactness, but all harmonious and generally concordant. All agree, for instance, with regard to the Yang-tse-kiang, the Mekhong, and the Salween, and trace them through the territory very much as we now know them actually to exist. The Sanpo, and its two north-eastern influents the Kenpou and Gakpou, they do not continue beyond the border of Tibet; but D'Anville says distinctly this river flows into the kingdom of Ava. Kian-loung's map says it passes through the region of the Mon tribes of Lhokabaca, becoming the Pinlang-kiang. The Kenpou is called the Tchod-teng Chou, and it is said to meet the Gakpo and flow into the Yaroo Sanpo. An exactly similar statement is made on the latest map of 1863, the only point on which I find a real difficulty being that the Gakpo is made the headwaters of the Shuéli. We must therefore identify them with the known rivers. I would just, however, ask attention to D'Anville's map, which is still the basis of all our knowledge of Tibet. It was for some reason in discredit with Western geographers for many years, and almost every map-maker undertook to improve upon it with reference to most of these south-eastern rivers. We have, therefore, some eight or ten different map arrangements (a little industry will furnish more) of the four or five rivers in this comparatively small space. Of course the mountains have to go with the rivers, and a collection of the whole of these curious productions makes the place look like a Miltonic battleground. No great damage has resulted, however, except to the maps; but it was this complete discordance between the authorities who have undertaken to amend the imperial Chinese records that led me to surmise that all was not quite correct. One authority would give the Kenpou and the Gakpou to the Irawadi; another would give them to the Brahmaputra, and allot the Souk to the Irawadi; a third turns all the former to the west, and takes the Upper Salween for the Irawadi; a fourth adds this to the already well-filled Brahmaputra, and further throws in the Upper Mekhong, cutting off all supplies from this river, from

the Salween, and from the Irawadi. Other mappists turn some of the upper rivers into the Mekhong; and there is almost no permutation these few rivers are capable of that has not been tried—and called geography. If even the authorities in London and in Calcutta had been agreed, I might have found a resting-place; but this was not so, and I was compelled to inquire whether the Chinese geographers might not be right after all. Then taking D'Anville's map and comparing it with the records of each traveller's path over Tibet, I found that, whether he was a trained surveyor or an ordinary observer, the results in Tibet itself were always the same, the map was not only fairly exact and accurate, but is useful for checking the surveyors. Towns, villages, rivers, and mountain passes are given, and found to be precisely where shown. This was the case up to the time of writing my Report, and I am glad to say has been so since. I shall to-night give an example of a correction made through this map. I think this ought to inspire a certain amount of confidence.

I will now extract a few statements from the Chinese geographies. The first is from the Imperial Geography of the Thang Dynasty (617–907 A.D.), of the time when Tibet was first subjected to China:—"The Pha-pou river is south-east of Lassa; it is also called the Dzang; the Yunan people call it the Ta-Kin-sha-Kiang. It comes from the most western part of Tibet. The Sui- (or little) Kin-sha-Kiang, the Lantsan, and Lu-Kiang equally take rise in Tibet; but the sources of the Ta- (or great) Kin-sha-Kiang are extremely distant from those three rivers. According to the geography of Yunan, the grand Kin-sha-Kiang comes from Tibet, enters Mien-tian (or Burma), has 5 *li* in breadth, and goes to throw itself into the sea." An ancient author, Hoang-chin-yuan, says: "The Lan-tsan (or Mekhong) is only one-fourth the size of the Lukiang (or Salween); but the great Kin-sha-Kiang is ten times greater than those two rivers." Now in my Report I estimated from the sizes given by travellers that the capacities of the Irawadi, Salween, and Mekhong, in the latitude of Bhamo, were as 9, 3, and 1; but Mr. Baber tells me I allowed too great a rise for the latter rivers; so that this ancient author is able to correct me. The Imperial Geography after quoting this, further says: "The Kin-sha-Kiang is made up of two rivers, the Ta-Kiu-Kiang, and the Pin-lang-Kiang." It describes some of its influents, and mentions that the combined river passes by Mano, and amongst other places Tchenago, which are our modern Bhamo and Tsengoo, or Tshempenago. "After quitting Bhamo it enters the plains, which it inundates regularly. Its width is 15 *li*,* and not 5, as the ancient writer states." Now as three Chinese *li* equal an English mile, this description of the inundation accords exactly with the five miles of Colonel Yule. The editors of the Geography add, "There is no doubt that this river is the Yaroo Sanpo of Tibet."

* Klapproth has leagues; but the Chinese is *li*.

The edition of the Geography in the British Museum is of about 1744, while that used by Klaproth seems to have been later, but they are the same in substance. The words of the great Emperor Kang-hi himself are worth quoting. He died in 1723. Writing a year or so before he died, in the 'Memoirs of the Manchou Dynasty,'* he says, "From my youth up I have been devoted to geography, and for this reason have sent my Notables to Kuen Lun and to Si Fan. All the great rivers like the great Kiang, the Hoang Ho, the Hé Chow, or Black River, the Kin-sha Kiang, and the Lan-tsan Kiang, have their sources in those regions. My messengers have examined everything with their own eyes; they have made exact investigations, and have embodied their observations in a map." He then gives precise details regarding the sources and courses of the Hoang-ho, of the Min-kiang, the Kin-sha-kiang, and of the Lan-tsan-kiang or Mekhong, and further says, "To the west of the Lan-tsan Kiang runs another river called Khara Oussou (or Black River)—the Hé Shui of the Yu King—and the actual Lu Kiang of Yunnan. It comes from the north-west of the States of the Dalai Lama, leaves the Khara Nor (or Black Lake), runs to the south-east, crosses the country of Kham, passes by the barbarians of Nou-i, receives the name of Nu-kiang, enters Yunnan near Ta-thang-yai; from there runs south, enters the mandariate of Lou Chang, then continues its course to the kingdom of Mien, or Burma." This account of the Salween is clear and precise; it is confirmed by the maps, and by the Description of the Rivers of China, which further traces the river sources in the extreme west to where they correspond with Nain Singh's description of the same river; while in its lower parts the testimony of the missionaries who lived on its border completes the identity and ought to render impossible any further map deviations respecting it.

After detailed descriptions of the other rivers, the Emperor goes on to describe the course of the Shuéli, the tributary of the Irawadi, and then says of the latter river, "There is still another river which passes by the extreme frontier of Yunnan; this is the Pin-lang Kiang, or Areca Palm river. Its source is in Ngari, a province of Tibet, to the east of Mount Gang-dis-ri (Kailas), or the Mount Dam-jak Kabub (horse's mouth). This river receives lower down the name of Yaroo Sangpo; it runs generally towards the east, deviating towards the south. It passes by the country of Dzung, and the city of li-kar Goung-gar, receives the Galdjou Mouran [the river of Lassa]; further turning to the south, crosses a country of independent tribes, and enters Yunnan near the old city of Yung Chow, taking the name of Pin-lang Kiang. It quits this province at the fort of Tha-pi Koung, and enters the kingdom of Burma." Here is a direct and distinct statement that the Sanpo of Tibet is the Irawadi of Burma, made on the very highest

* 'Toung Houa Loä, or Manuscript History of the reigning Manchou Dynasty.' Pekin, 1721. Copy in British Museum.

authority possible. The only point open to question in it is where the river is alleged to enter the province of Yunnan, as the western border of Yunnan is some 30 miles east of Bhamo in that latitude, but further north it is not so certain; and even there has varied with the spread of Chinese conquest. While writing, Bhamo itself was again held by the Chinese, and if this was by authority of the Government, the Irawadi was again in Yunnan.

Both the 'Description of Tibet' (1792), which I describe fully in my Report, and the 'Description of the Rivers of China' (1776), which Professor Douglas translated for me, confirm and extend these accounts, giving minute details regarding the various influents. And, to bring down what may be called the official Chinese account to the latest date, I may mention that I travelled down the Irawadi in 1879 with a Chinese gentleman, who I afterwards learned was a geographer sent by the Viceroy of Sze-chuan to Lassa and India. He could not cross our frontier from Lassa, and came down the Irawadi, afterwards reporting to the Viceroy on his journey. The *Pioneer* newspaper of 29th January, 1880, says that the traveller Huang Hao-po "is said to assert very positively that the Sanpo of Tibet flows not into the Brahmaputra, but into the Irawadi." Dr. Macgowan, the well-known medical missionary of Wenchow, wrote and informed me that Huang Hao-po's report had been submitted in Sze-chuan, and was in substance to the above effect.

Now we have here an unbroken record of testimony, extending over 1200 years up to the present date, of the actual rulers of the country in dispute, to the effect that the great river of Tibet is the great river of Burma; and, although our geographers make a mystery of it, there can be none to them, as they have complete access, within their own borders, to all parts of this river's course; and there is evidence available that some of the great roads of the country actually follow the valley line, and are frequented by soldiers, pilgrims, traders, and official and ordinary travellers. The only matter for mystery is how this testimony can be called in question, especially as it is confirmed by every item of geographical evidence available, when that evidence is properly interpreted.

I shall further proceed to adduce this testimony, but would invite attention again to the names given to our river in the part where Western maps show it to be such an insignificant stream. To begin with the name of the Yunnanese. These people take the biggest river they know—the Kin-sha-kiang—the head-waters of the great Yang-tse-kiang; they call this the Sui Kin-sha-kiang, or Little Kin-sha river; and then for contrast call the upper Irawadi the Ta-Kin-sha-kiang, or Great Kin-sha river. There must surely be something in this. Again, the official Chinese name, Ta-KIU-kiang, for our connecting link between the Sanpo and Irawadi, is worth noting. It is absolutely identical with the Shan name Nam-KIU-long of those who live upon its borders, that

is, the Great Kiu river.* I again ask that these names and their meanings be remembered.

After D'Anville's map was published about 1733 in Paris, some question appears to have been raised as to his authority for connecting the Sanpo with Burma; and Father Gaupil, writing from Pekin to William Delisle in 1754 and 1755,† says with reference to this, "M. D'Anville was quite right in making the great river Yaroo Sanpo pass by Ava." Again, in August 1859, Bishop Thomines de Mazure, writing from Bonga on the Salween, within 100 miles from the river in question, to my friend Bishop Bigandet of Rangoon,‡ says:—"To me there is not the least doubt that the great river that flows through the whole length of Tibet, marked on the map Yaroo Sanpo, and called by the Tibetans Yar-KIOU-tsangpo, is the Irawadi. The Brahmaputra cannot possibly be the Yar-kiou-sanpo." He remarks, "It takes seven days of hard travelling to go from the Loutskiang (or Salween) to the Ken-poo-kiang, a river of Dzain. The distance in a straight line is very short, but in countries like these, where there is nothing but ascending and descending, the direct distance gone over during one day is very small." I shall presently refer to this extract, which is worth noting. M. de Mazure lived at Bonga for some years, and was followed there for a short time by the Abbé Desgodins, who at first believed the Sanpo to be the Irawadi, but afterwards was converted, and now supports the Brahmaputra claims. He, however, makes them very difficult to support. Writing from Tibet on March 28th, 1877, to his brother § in France, he says:—"The following is some new information which should confirm the identity of the Yar-KIU-tsangpo river of Tibet with the Brahmaputra. An old Llama related to me yesterday that in his youth he had travelled a great deal and had visited nearly the whole of Tibet. He had followed the great river from its source in or near the lakes of Tso-ma-pang (Mansarowar), which are situated in the western part of the province of Ngari, the most western province of Tibet, and while making his pilgrimage of devotion, he had arrived as far as the frontier of the savage tribes of Lhopas. He said that at a distance of some days' march from Lassa the river turns towards the south, and making a long bend, *passes through the Tibetan district of Hai-yul*, a very populous and rich district which is situated just to the north of the Lhopas, the river enters the country occupied by the wild tribe and passes through perpendicular rocks, precipitous and bare, without paths, and over which the only passage is by means of bad ladders made by stems of climbing plants." The whole of his information, he adds, "induces him to believe that the fall at Brahmakund must be precisely the fall of the Yar-kiu-tsangpo, which then becomes the Brahmaputra." If we had no

* Ta = Lóng = great; Kiang = Nam = river.

† Klaproth, 'Magasin Asiatique,' 1828.

‡ J. A. S. B., 1863.

§ J. A. S. B., 1876.

information about the Brahmaputra at the Kund this would be a tenable position ; but, as it is, it is absolutely fatal to that connection.

For he goes on to describe the position of Hia-yul as follows. The independent principality of Poyul (Chinese Pomi or Pomed) has on the west the district of Kongba, which reaches to Lassa. "The eastern limit of Poyul is the western slope of the chain of mountains which comes from north to south on the right bank of the Lu-tse-kiang (or Salween). The country of Poyul (Pomi) does not touch, to the south, the chain of the Himalayas and the country of wild tribes, from which it is separated by a band of country governed by Lassa. The names of the different Tibetan districts of this zone going from east to west are as follows :—Hia-yul to the north of the Lhopas (Abors), Tse-tang, Sang-ye, Menupa." Here we have a distinct statement that the Sanpo flows through the district of Hai-yul which lies between Po-yul and the Lhopa country, immediately west of the mountain range on the right bank of the Salween, which is thus in 96° E. long. Now this district of Hia-yul (the Hloyul of A—k) must thus lie to the extreme north-east of Assam, and a river passing through it from west to east must get beyond all the tributaries of the Brahmaputra except the Brahmakund one. M. Desgodins' further account that the river enters the country of the wild tribes of Lhopas to the south of Hia-yul is identical with that of the Chinese maps and geographies, and is further confirmed by the narratives of the explorers of the survey of India.

But again I must call attention to the new name of the river, given independently by MM. de Mazure and Desgodins, as that by which the Tibetans in that neighbourhood call the Sanpo—the Yar-KIU-sanpo. A small river of that name is described by the Chinese as lying to the north of Lassa, but this is a local name for the great river. Yar in Tibetan means upper; but as the Tibetan spelling is not given, this word cannot now be finally identified. However, we have here the same word KIU denoting the great Sanpo of Tibet, where it disappears beyond the extreme north-east of Assam, as is given locally to the Irawadi where it first appears in the same longitude, and identically the same name as is given to the alleged connection of the two by the official Chinese. It is well known that the Tibetan word Sanpo means river; and if Yar is the word Upper, we have a series of very curious coincidences in names, should the Sanpo, after all, go to the Brahmaputra. I must again ask that these names be remembered, as we have still others of these wonderful rivers to be presently considered.

The information furnished by the native explorers sent to Tibet by the Survey Department of India is most valuable, and forms one of the many claims to admiration for the work done by that Department. Nain Singh * fixed the position of Chetang on the Sanpo in November

* Journal R. G. S., vol. xlvii.

1873, the river being then 500 yards wide, with maximum depth of 20 feet; but in May, June, and July, he said the river was much flooded, and had a width of $1\frac{1}{2}$ miles. He found the course of the river fairly accordant with D'Anville's map. He learned that the Sanpo flowed by Gyala, and continued for 15 days' journey through the rice-producing country of Lhokalo, or Lhoyul, whose people are independent of Lassa, between which place and them the district of Komba intervenes; and they hold no communication with the people on their south, the Shiar Lhoba, a wild race who inhabit the country through which the great river flows to Gya, after being joined by two large rivers from the north. This account of the river takes it through Lhokalo, the Hia-yul of Desgodins, and through the country south of this, where the wild tribes of Lhokbas live—the Lhokabas or Lhokapatras of the Chinese maps and records; with which there is thus a complete agreement so far.

In 1878 * Lieut. Harman trained another surveyor, G-m-n, and sent him to continue the exploration of the river. Lieut. Harman records that he did not find his work quite satisfactory, but some valuable information was acquired; especially the fact that the river flowed almost due north-east from long. $93^{\circ} 15'$ till it nearly touched lat. 30° N. in long. 94° . Gya-la proved to be 287 miles from Chetang by road, which afterwards continues on the right bank of the river for four days, and then comes to the Lhoba country, which is peopled with all the outcast rogues of Tibet; the inhabitants proper having a dialect and costumes different from the Tibetans. Harman identifies several of the towns with those of D'Anville's map.

The able explorer A—k, an account of whose journey has lately been given to the Society by General Walker, enables us to localise still further some of the data regarding the river in these parts. A detailed narrative with large map has lately been published by the Government of India, for a copy of which I am indebted to the kindness of General Walker, and this I shall now use. A—k made his way back from Lithang and Batang to Rima and Sama, and being unable to cross from this place to Assam, turned north and west towards Chetang. Sama and Rima are the very heart of the mysterious region which no trained traveller has yet been able to cross from either side. Here the French missionaries Crick and Bourry were murdered in 1854, and every explorer has been turned back from this part, thus preventing a complete examination of this country, such as would finally settle all questions concerning the rivers flowing through it. Sama is seven miles south of Rima, both being on the river of Dzain, or Zayul, called the Zayul-chu. The latter place is near the junction of two rivers from the west of north and north-east, called by A—k the Rong Tchod Chu, and Zayul-chu; and, since Rong is an adjective, signifying deep narrow valley, the former is

* 'Report of Survey of India' for 1878-79.

identified with the Tchod Teng Chu, or Kenpou of D'Anville and the Chinese maps. The north-eastern branch is the Gakpo.

A—k fixes the *locale* of the Hlokbas. Hlo in Tibetan simply means south, and in its most general sense Lhokba is southern people. But the old terms of Lhokabaca and Lhokapatra given to the wild tribes of the country through which the Sanpo is said to flow, mean the southern people with tattooed faces. A word on the peoples of these countries will not be out of place here. The last census of British Burma states that no less than sixty-three distinct languages or dialects are spoken there; twenty-one of these belonging to the permanent populations. In Northern Burma and this particular region, the number is very much extended; but on examination the majority are found to belong to three or four principal families. These are the Burmese, the Shan, the Mishmi, and Tibetan; but the Burmese and Tibetan are closely allied and belong to one stock; and there is reason to suppose that a stream of commingling and allied dialects flowed continuously at one time all the way from the plateau down the Burmese valley. At present the Burmese proper are completely cut off from the plateau, and in the plains do not ascend much above Mandalay. But various tribes of this family, some in a very wild state, extend north in the Aracan Hills; the most conspicuous and powerful tribe called Kyins or Chins reaching from the neighbourhood of the Irawadi delta to very far north. These Chins, Professor Forchhammer has lately shown, are the typical stock of the whole Burmese family, and still retain the primitive customs. One of these customs is tattooing, which the Burmese are the sole people in that part of the world to practise, excepting, of course, such Shans and others as are entirely under Burmese influence. The Chins carry the custom further, and tattoo their women's faces, and are the only people who still do this. Professor de Lacouperie has lately shown* that the Shans are one of the aboriginal races of China, who were driven southwards before the expanding empire in the earlier centuries of our era, large bodies passing through Yunnan, and occupying the valleys of the Upper Irawadi and its tributaries; where they established the kingdom of Pong † north of Bhamo; sending branches into Assam, where as Ahoms they became the dominant race. The Khamtis are a tribe of that family. From the western side again comes the stream of the Mishmis, who appear to include as one family the Miris and Abors of North Assam and the Kachyens of Upper Burma. While the Shans always occupy the plain ground of the valleys, the others interpenetrate with them along the mountain ranges. But both together have combined to cut off the Burmese tribes from congeners still found to the north. Dr. Anderson, while I was travelling with him, took several lists of words from Leesaws and other mountain tribes coming from the far north of Burma, between China and Assam, and a close resemblance was found between

* 'The Cradle of the Shan Race,' 1885.

† Dr. Anderson.

these and the Burmese language. The Leesaws are given by Bishop de Mazure as one of the principal tribes of Lhokbas, and there is reason to believe that the Tibetans now apply this term exclusively to tribes of the great Burmese family cut off from the rest by the irruptions described above, and the constant repetition of the terms Lokabaca and Lokapatra show that the wilder tribes formerly kept up the custom of tatooing the faces like the Chins, their relations, do now. And the specific mention of nomad and wild tribes of Lhobas, as the people through whose country the whole of the evidence available shows us the Sanpo to pass, permits A—k's narrative to fix the exact neighbourhood. Thus on the 16th of July, 1882, when 24 miles north of Rima, he says, "Opposite this hamlet a stream from the north-east joins the river, and up the former a path goes to the nomad camp of Luba, about 25 miles distant." Again on the 19th, having gone 14 miles further north, he says, "About 45 miles to the north-west is a sacred peak called Pemakaun, which is rarely visited by pilgrims as they have to pass through the country of the Lhobas, who are much addicted to robbery. These people inhabit the Lhoyul (Hia-yul) district to the north-west of the Mishmi country. Their manners and customs are similar to those of the Mishmi, though their language is somewhat different." Nothing can be more explicit than this, the nomad and robber tribes of Lhobas were to the east and west of his route, with the Hia yul country to the north-west. That this is the same region as that alluded to by the surveyor G. M. N., as a country of outcasts, is shown by further mention of the fact that the district A—k was passing through is the place of penal servitude for all Tibetan convicts.

This carries the source of the Sanpo far to the east of the point where all our geographers make it enter Assam. General Walker's map renders Lhoyul far west of the position given to it by Desgodins, and barely allows the Sanpo to enter Lhoyul, leaving a blank with the words "mountainous country" over the region where by the above testimony the river should flow. Now A—k furnishes distinct evidence that a deep valley such as the river would occupy runs parallel to his course the whole way from Rima to Chetang, at about 20 to 30 miles distance from him. Thus Mr. Hennessey says, "It is understood that the Rong lay below (south of) A—k's route by only some 20 or 30 miles the whole way to Chitang via Sama and Ata Gang La." The word Rong he defines to "mean the country with rocky, rugged, and precipitous hills and exceedingly narrow valleys, with plentiful cultivation, and a climate admitting of two harvests annually." This only happens in the deep warm valleys lying low in South-eastern Tibet. Thus A—k actually indicates the position of the Sanpo valley as some 20 to 30 miles from Sama, and to the left of his route.

This will be of little service to my purpose, it may be said, as Wilcox and Mr. Hennessey's map with A—k's narrative show Sama to be within

20 or 30 miles of the British frontier, which is situated on a ridge of mountains 15,000 feet high. A—k's narrative permits any doubts on this point to be removed. I would here beg to testify my admiration of the excellence and accuracy of A—k's work, which is so carefully and precisely recorded as to enable errors in the map to be rectified and made to agree better with the Chinese maps and records. Thus, on looking for the Gakbo river in the Zayul-chu, I found that its upper course had been cut somewhat short; and on comparing Mr. Hennessey's map with the narrative, I found some discrepancies. As A—k's narrative is a model for precision, I cite it in full for a day or two's record. He is crossing from the Salween to the Zayal-chu by the Tila La Pass, and says:—

“On the 20th, marching $2\frac{1}{2}$ miles up *the stream*, we observed a frozen lake to the left of our route, and ascended thence $1\frac{1}{2}$ miles over snow to the Tila Lá Pass (height by boiling-point 16,110 feet). The district of Nuchu Giu lies between the two passes Koli Lá to the north-east and Tila Lá to the south-west. Descending for $1\frac{1}{2}$ miles over snow to a *stream* proceeding from the pass, and following it for six miles through a *thick forest*, we crossed a *stream* from the north-east and stopped near its junction for the night. On the 21st April, 1882, marching $3\frac{1}{2}$ miles along *the stream*, we arrived at the hamlet of Rika, containing six houses; and $1\frac{1}{4}$ miles further, in which distance *the main stream* received two tributaries from the north and one from the south-east, we reached a small hamlet, a little beyond which is another tributary from the north; $6\frac{1}{2}$ miles beyond we arrived at another small hamlet of three houses, situated near the junction of a *stream* from the south, where we halted for the night. . . . On the 22nd, marching $2\frac{1}{2}$ miles along the *stream*, we arrived at the Gomba of Dowá (height by boiling-point 8300 feet), surrounded by 25 houses, situated at the junction of *the stream* with *the river* called Zayul Chu, coming from the north.”

Now I have emphasised the word *stream* and the word *river* as they are used by A—k to enforce a contrast. Throughout his narrative he is most particular in these distinctions, and was well qualified to make them. On his next day's march he crossed the river by a wooden bridge and found it 80 paces or 210 feet wide, deep, and with a rapid current. This proves it to be a considerable river, and we should expect it to come from a distance northwards; and, as is known from independent information, with Sanga or Seronga, the principal town of Zayul, upon it. But on the map no river is shown to the north—only a rivulet a few miles long, coming from a lofty range running east and west. Further, on measuring on the map the length of the stream from Tila La to Dowá, I find it scale $27\frac{1}{2}$ miles, while the narrative only gives $21\frac{1}{2}$ traversed. Even a perfectly straight line between these places scales over 26 miles on the map.

I think I hardly need to point out to members of this Society that

when a survey is shown on small scale maps correctly it always scales shorter than the ground distance; the disproportion in very rough ground being sometimes as much as one-fourth or one-third. And, on carefully examining Mr. Hennessey's map, I find that in all parts of the route where latitudes have been taken by A—k, no similar distortion occurs, but between Jior on the Salween and Rima there is throughout the same exaggeration of scale. I give in table form the distances of each day's journey of A—k between Lithang and Sama, as furnished by the narrative and measured carefully by myself on the map. The heights are also given, and a diagram shows them (see pp. 317, 318). From these the nature of the stages may be compared. From Lithang to Batang the road was mostly in high ground with a final fall of 7000 feet. From Batang on the Kin-sha-kiang, there is a rise of 3000 feet to a pass, and a fall of 2500 to the Mekhong; with a subsequent rise of 2000 and fall of 4000 feet to the Salween, the distances being considerable and no exceptional difficulties noted. Then comes the very stiffest bit of the whole journey, a rise of 9000 feet up the beds of mountain torrents in less than 50 miles; and a fall of 8000 in 21 miles through the dense forests and extremely rough country described by Bishop de Mazure.

I will ask your attention to the following points:—1st. On the stage from Lithang to Batang the map distances measure nearly one-fifth less than the narrative distances. 2nd. From Batang to the Salween they measure one-fourth less; and this is a fair average for such country. 3rd. In not a single instance of either stage does the map length exceed the route length. 4th. From the Salween to Sama, where from the difficulties met with we should expect further shortening, in nearly every instance the map distances are the greatest, in several cases by almost 50 per cent., the result being to throw Sama much south-west of what the narrative justifies. 5th. When the same correction of one-fourth which is derived from the Batang stage is applied to the Salween Sama stage, with the results as given in the table and plotted on the same map, Sama is found to be 34 miles to the E.N.E. of Mr. Hennessey's position, in lat. $28^{\circ} 22'$, long. $97^{\circ} 42'$. I think I will have the support of every professional geographer in making that alteration. I would mention that I have found no similar mistake in any other part of Mr. Hennessey's map.*

Further, much reliance is placed on the fact that Captain Wilcox's position of Sama, in lat. $28^{\circ} 2'$, long. $97^{\circ} 3'$, agrees with Mr. Hennessey's in lat. $28^{\circ} 7'$, long. $97^{\circ} 12'$. I have now to show that Captain Wilcox fell into a mistake very easy to be made in those parts. His own

* In making the map from the narrative, 2000 paces are assumed to be one mile; and then the route is plotted on a large scale, and a factor of correction for rough or easy country shortens or lengthens the map distance. In this case A—k must have ascended the pass with strides four feet long, and descended with five feet strides for ten miles at a stretch—an unique geographical feat.

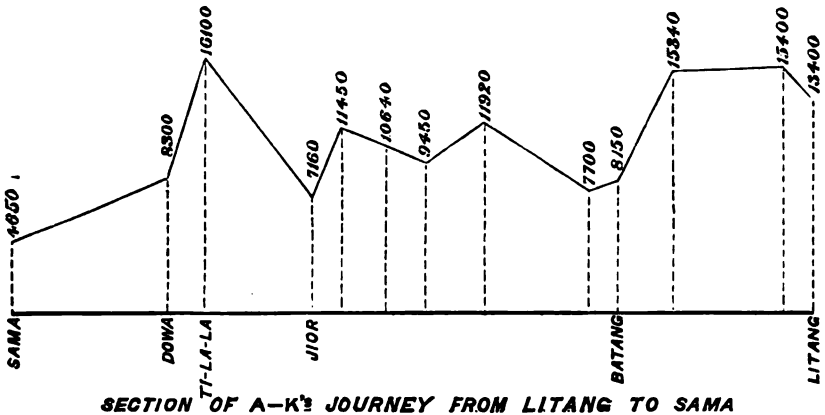
TABLE II.

A—K's JOURNEY, LITHANG TO SAMA. COMPARISON OF ROUTES.

Date.	Distance.			Remarks.	Date.	Distance.			Remarks.
	Itinerary.	Map.	Corrected.			Itinerary.	Map.	Corrected.	
Stage Lithang to Batang.					Stage Jlor to Tila La.				
March 7	miles. 13½	miles. 11½	..	feet. 13,400	April 6	miles. 5½	miles. 7½	miles. 4½	feet. 7,160
" 8	16½	15	..	15,400	" 8	8½	7	6½	..
" 9	18½	16	..	..	" 9	5½	7½	4½	..
" 10	13½	12½	..	..	" 17	8½	10	6½	..
" 11	16½	13	..	15,340	" 18	11	13½	8½	..
" 12	13½	11	..	..	" 19	9½	10	7½	..
" 13	13½	10	..	8,150	" 20	3½	3	2½	16,110
Totals ..	105½	89			Totals ..	52½	58	39½	
Batang to Jlor on Salween.					Tila La to Dowa Gomba.				
March 15	19	14	..	8,150	April 20	7½	8	5½	16,110
" 17	10½	10	..	7,700	" 21	11½	16½	8½	..
" 18	12½	9½	..	..	" 22	2½	3	2	8,300
" 19	13½	8	..	..	Totals ..	21½	27½	15½	
" 21	17	12	..	..			
" 22	13½	10	..	11,920					
" 24	12½	11	..	..			
" 25	15	12	..	9,450					
" 26	15	12	..	10,640					
" 30	10½	6	..	..			
" 31	12½	8	..	..			
April 2	5½	3	..	11,450	April 22	11½	14	8½	8,300
" 4	11½	9	..	..	" 23	10½	16	8	..
" 5	4	4	..	7,160	" 24	17½	16	13½	..
					" 25	13½	12	10½	4,650
Totals ..	171½	128½			May 23	7	7	5½	..
					Totals ..	60½	65	45½	

manuscript work and surveys I have examined in the India Office, and they are excellent and trustworthy; the results of his personal observations being confirmed by later surveys. In this instance he travelled from the Brahmakund, intending to reach Rima and Sama, but was compelled to return after reaching lat. 27° 53', long. 96° 50' in the mountains, the route being of exceptional difficulty. At his last halting-place he heard that Rima was only a day or two's journey off; and Cooper, who got two days' journey further in 1869, heard exactly the same thing. It is, however, well known that the Shans and other natives of these parts call the district by the name of the principal town or village in it; so that the information given was correct, but not precise enough. The village of Rima would have taken both Wilcox and Cooper still as many days' journey to the north-east as it had taken them to get from the Kund to where they turned. As proof of this, I now

show, through the kindness of Mr. Saunders, an original map by the Khamti chief Chowsam, who was sent on a mission to Rima in 1869 from Assam, and an account of whose journey is to be found in vol. xiv. of this Society's 'Proceedings,' by Captain Gregory. Chowsam, in the end of the same year, acted as Mr. Cooper's guide. The map, which



appears to have been drawn up under Captain Gregory's supervision, gives each day's journey, with the names of the villages on the route in Ahom and in English. The Ahom I can get no translation of; but the English names show that what it took 15 days' march for Cooper to do, Chowsam alone did in six. They went by exactly the same route; and Wilcox appears to have followed much the same path for 12 days' march, Chowsam doing the distance alone in $4\frac{1}{2}$ days. Wilcox judges that he travelled less than five miles a day; but allowing him 50 miles for 12 days, we have an estimate of Chowsam's marches. Well, he took eight days' march from where Wilcox stopped, and $6\frac{1}{2}$ from where Cooper stopped to get to Rima; and, what is noteworthy, he shows long stages in the plain, near Rima, short ones in the mountains. Captain Gregory, in his paper, judges that Chowsam only went some seven or eight miles a-day; and from the above data I would consider this fair for the hills; but he must have done 12 or 15, a moderate journey for a native, in the plains. I am therefore justified in moving Sama and Rima much further to the north-east than Wilcox shows them, and a suitable correction makes the new position accord exactly with the former one from A-k's narrative. That is, we gain a complete half degree in which the Sanpo can come down comfortably to the Irawadi. The new longitude for Sama places it nearly due north of the Mekha or Little River of Major Sandeman's map. A-k describes the Zayul-chu at Sama as 250 paces wide, deep and rapid. Alaga gives us the size of the Mekha as 300 paces wide, with a consider-

able body of water. A distance of 150 miles intervenes, however, between the two points; and it may be claimed that till we actually make the connection there is nothing to show that the Zayul-chu does not still turn to the west and become the Brahmakund. If it does, of course the Sanpo cannot reach the Irawadi, and there is an end of the matter. But if it can be shown that it is quite impossible it can be the Brahmakund, and must necessarily come to Burma, then we have A—k's distinct statement to the effect that the Zayul-chu flows into the Sanpo. His words, written near Chetang, are:—"The general direction of the river is eastwards. . . . In its further course it receives contributions from innumerable streams and watercourses, which take their rise from the southern and western slopes of that portion of the range which lies between the Ata-gang-la Pass on the east [long. 97° E.] and the Gia-la Pass on the west. It is said that the river finally inclines to the south, and, receiving a tributary of nearly half its dimensions from the east named the Zayul-chu, flows into India."

I will now leave this and turn to the final stage of the question, which is to show that the Brahmaputra has already a sufficient watershed of its own, and that the Sanpo cannot possibly enter it. Time will not allow this to be gone into at length, and I must therefore refer to my Report for the details. In brief, the argument is this:—The Brahmaputra is estimated by Rennell to be in its flood discharge somewhat greater than that of the Ganges, which he gives at 405,000 cubic feet per second. Wilcox measured the Brahmaputra at Goalpara in January 1828,* and calculated that it then discharged below all its influents 146,188 cubic feet per second.† [It was 3390 feet wide, greatest depth of 33 feet, and mean of 21 feet. He does not give its flood rise, so its flood discharge cannot be computed. But Baron Schlagintweit, in June 1855, took most exact measurements near Gowhatty, where it has received all its principal tributaries but one, and drains some 40,000 to 45,000 square miles of Assam and the Himalayan slopes, including some of the rainiest country in the world. 'He found the volume to be 318,200 cubic feet per second; and, with an extreme high flood rise of 31 feet to a mark shown him, he computed the discharge to be 894,700 cubic feet per second. At Goalpara, from Wilcox's data, I roughly computed the extreme flood discharge to be nearly 1,100,000 cubic feet per second with the whole of the basin of 65,000 square miles draining into it. This would just make it comparable to the Irawadi above Bhamo, where only 5000 to 10,000 square miles are given it, so that there is here a discordance requiring explanation by those who advocate the Sanpo-Brahmaputra connection.

Again, Captain Harman measured the whole of the influents of the Upper Brahmaputra, which might be the Sanpo, and computed their flood volumes. He found that the largest, the Dihong—the principal claimant—had only 423,000 cubic feet per second in extreme high flood, the Subansiri 240,000, and the Brahmaputra above Sadiya 326,000. These

discharges are, perhaps, underestimated, but not materially. Now I showed from Nain Singh's and other accounts of the Sanpo that at Chetang it must have an extreme high flood of some 750,000 cubic feet per second; and as from what A—k says of the innumerable streams in the five degrees of longitude between Chetang and Ata Gang La, in 97° , this quantity is likely to be much increased, we have a conclusive argument against the Sanpo ever reaching the Brahmaputra, as it has no influent large enough to hold it. While the size of the Sanpo, thus determined, exactly fits in with the requirements of the great branch of the Irawadi in lat. 26° .

Still further, I showed that the Brahmaputra influents when compared amongst themselves on the maps then existing, had basins amply sufficient for their supplies. Thus the Dibong has a discharge of 144,000 cubic feet from about 2500 square miles; Captain Harman computed that 7000 square miles of basin in the Subansiri gave 240,000 cubic feet per second; and the total watershed of the Brahmaputra above Sadiya of 7000 square miles gave 326,000 cubic feet, and as these figures are very nearly in the ratios of one-third, four-sevenths, and three-fourths to the 423,000 cubic feet per second of the Dihong, it required no great strain on hydrographical science to show that its basin could not possibly require more than from 7500 to 12,000 square miles, under the strictly analogous conditions of climate and position on the Himalayan slopes, to furnish its volume. And when, in 1878, some 10,000 square miles of new watershed were added exactly in the spot required, to the north and north-west of the Dihong, by G. M. N.'s discovery of the Sanpo and its southern border mountains going north to 30° lat., the problem seemed to me to be finally settled. I was soon undeceived. Immediately the watersheds of these Brahmaputra influents began playing protean pranks all over the map. The Dihong itself, whose principal branches are said, by the natives resident in it, to come from the west and north-west,* was immediately turned nearly due north, and made to pass through or skip over the Himalayas, at a point far west of where the Abbé Desgodins and all the native surveyors' evidence shows it to continue its eastward course; all the new basin area was added to the Subansiri in direct contradiction of all previous evidence and statements on the subject; while the Dibong, which is in itself an affluent of the Dihong, and whose basin has been accurately determined by Captains Bedford and Woodthorpe to be about 2500 square miles, suddenly develops octopus-like arms to the north and annexes an additional area of nearly 20,000 square miles. I must refer you for this to the map accompanying Major Sandeman's paper in 1882, where you will see side by side on the same sheet the large scale map with the correct survey of the Dibong

* Wilcox, 'Asiatic Society's Journal,' 1832, p. 314; Captain N. Michell P. R. G. S. vol. iv. p. 676. Harman also testifies to this effect.

basin, and a small scale one with the arrangement just described. That map and its like form a severe comment on the *orthodox* geography of the Sanpo-Brahmaputra.*

Early in the paper I said I would give an instance of the danger of using minimum discharges of rivers in discussing questions relating to their watersheds. The reason is obvious. No permanent marks on the channel show the minimum, which can only be known by several years' careful watching. Any casual measurement may give most deceptive results; as in cases where the discharge is only a few thousand cubic feet per second, a local shower of rain may entirely derange the results. Thus Harman measured his discharges of the Brahmaputra influents between 25th February and April 6th, 1878, the dry season of the year. It happened, however, that Captain Woodthorpe was just then in the hills surveying the basins, and records that very heavy rain fell from time to time during that period, especially in the Dibong basin, where he states that it began to rain at 8 P.M. on the 28th March, and continued for twenty-six hours, without a moment's cessation, the river rising 26 feet in twenty-four hours. Harman's work on the Dibong was done on the 27th, so he escaped this flood; but he nowhere notes any of these rain storms, which must have been frequent. As the same objection applies to the whole of such measurements, I consider it unnecessary to notice the arguments based upon them.

We are, however, indebted to all the surveyors for the most valuable information they have placed on record; but as time is so short, I will only cite the following testimony on this matter gathered by them from the natives:—Thus, in 1828, Captain Neufville, an able and accomplished observer, in his paper on the geography of Assam, says,† “The existence of a very large river, called the *Sri Lohit* (or sacred stream) running at the back of the mountainous range [north of Assam] appears to be too generally asserted to be altogether void of foundation, but I am totally unable to ascertain the direction of its course. . . . It must be a stream of great importance, as it is familiar to all the tribes with whom I have held intercourse.” He quotes the chief “Bisa Gaum,” the most intelligent of the Singphos from the extreme north-east mountains of Assam, as mentioning “a river called the *Sri Lohit*, between the country of the Bor Khamtis and the border of China, flowing in a southerly direction to the Irawadi.” Again, in 1832, Wilcox says, “A tradition prevails with the Abors [hill tribes] of the Subansiri that their hunters once, travelling in quest of game, went much further to the north than usual, and that they arrived at the bank of a noble and rapid river separating their wild hills from cultivated spreading plains, whence the

* This same area of 20,000 square miles is added in the official Calcutta map of 1883 to the Dibong; while Hassenstein's map of 1882 gives considerably more to the Brahmaputra!

† Captain Neufville, ‘Asiatic Researches,’ vol. xvi.

lowing of oxen was distinctly audible. Another account they mentioned of the Dihong Abors, is that the Dihong is an anastomosing branch of a river of great magnitude, called *Sri Lohit*, which also throws off the *Bramaputra*, and passes into unknown regions to the eastward. The Abors are supposed to see this *Sri Lohit*, but it is too rapid and too broad to be crossed." * In 1876, Captain Harman, in an official report, says, "The tribes known as Bor Abors inhabiting the hills about the Dihong, trade directly with the Tibetans . . . The Bor Abors assert the Dihong to come from the west, and to be an offshoot of the great *Sri Lohit*, which flows on to the east." † These officers were all opponents of the Sanpo-Irawadi connection, and this testimony as to the native record of the existence of the great river *Sri Lohit* flowing eastward to the north of the Himalayas, past all the influents of the *Brahmaputra* must be accepted as irrefragable. And also, that a river running north and south, also called the *Sri Lohit*, flows into the *Irawadi*, from the place where the great river disappears. And further, it will now not surprise you when I cite a single extract of a few words from Wilcox to show that *Sri Lohit* is the Assamese name of the *Irawadi* itself. Thus Wilcox, "From what the natives said respecting the *Siri* or *Sri Lohit* or *Irawadi*, Lieut. Burlton was inclined to think that that river rises at the same place." Now *Lohit*, like *Myit* in Burmese, is a word given only to a great river. It is not given even to the *Dihong*, and yet it is applied both to the *Sanpo* and to the *Irawadi*, which have in common the term *Sri Lohit*, or great sacred river. If you can recall the identity of naming of these two rivers, running through Tibetan, Chinese, Shan, Mishmi, and Burmese, and this from great antiquity, for Ptolemy's maps show that the *Sri* or *Seres* river was known to him, we have a concurrence of evidence to a common point difficult to refute.

We now again approach the neighbourhood of Sama, for I have just one more argument to offer; and, to those who still think it an open question a final and decisive test to suggest. I condense into as few words as possible. The *Zayul-chu* when last seen by A—k at Sama was over 600 feet wide, deep and rapid, as large as the *Thames* at Putney, although it was then the dry season. The *Brahmaputra*, at and above the *Kund*, the sacred basin which gives its name to the *Brahmaputra*, is at the same season a much smaller river. Thus Neufville calls it a mere mountain rivulet. Bedford, in March 1826, says "it was 200 feet wide below the *Kund*, flowing with great force and violence." Griffith, in October 1836, saw it at the same place, and says its bed is 100 yards wide, but the water then only occupied 50 yards. It had the appearance of great depth, its general course being gentle. The water-mark of floods was some eight feet above its then level. Above the *Kund*, whose height he fixes at 2060 feet above the sea,

* Captain Wilcox, l. c. 1892.

† Captain Harman. See 'Report on Irawadi River,' i. p. 153.

he describes the river in November as not forty yards broad, with the appearance of great depth, and roaring along in fine style. Wilcox gives a similar account. Above the Kund he speaks of it as "deep in its narrow chasm, and white with foam." Again, "foaming at the foot of the precipice." Again, "the river is but forty to sixty yards wide." "The river rushes with great violence." In his manuscript diary in the India Office I find the following: "October 20th, 1826. The Brahmaputra above the Kund is narrow, *and there are many rapids.* 25th. The river 40 to 60 yards broad, rapids numerous (lat. $27^{\circ} 54' 54''$)."
Cooper, in December 1869, says, when some 50 or 60 miles up the stream:—"Throughout the whole distance from the Brahmakund, the occurrence of numerous rapids, narrows, and rocks renders navigation out of the question." At Bowsong's, the end of his journey, it was not a stone's throw in width. Now this is almost the only information we have about the size of the river; and it does not appear to me to be nearly as large as the Zuyal-chu at Sama.

But not to dwell too much upon the size, we have to consider how the Zayul-chu, which is at a level of 4650 feet at Sama, gets through the immense mountain range running north and south between it and the Kund, which is at a level of 2060 feet. On the map are given the heights of the country as accurately determined by the Survey of India. At Sadiya the height is 400 feet; but east of that the plain rises rapidly, and in a straight line 20 miles off it is 1065 feet high, with a still more rapid rise to the edge of the plain at the Kund, which is about 40 miles from Sadiya. Bedford ascended most of the way by boat to the Kund; but found the river full of rapids, all small ones—some 5 feet fall spread over 50 to 200 yards—and the general slope of the river appears here, in the plains, to be about 40 feet per mile. Above the Kund the statements quoted about the rapids, and the violence and force of the current prove the fall to be very much greater. Turn now to the Zayul-chu, and we find that from Tila La to Dowa it falls 8000 feet in 21 miles, say nearly 400 feet per mile; and from Dowa to Rima 3650 feet in $53\frac{1}{2}$ miles, or 70 feet per mile; this being in the plains. Now on Wilcox's map the river length between Rima and the Kund is 64 miles; and adding one-fourth of this for zigzags and curves not shown, we have a river distance of 80 miles. Thus comes the strange fact that the same river which falls 300 to 400 feet per mile in the mountains, 70 feet per mile in the plain at one side, and 40 feet per mile at the other, when it gets into this new range of mountains intervening between the two plains, and is a roaring, violent, foaming torrent with numerous rapids, has only a fall of some 30 to 35 feet per mile. And look at the heights of the mountains it passes through—a ridge of 12,000 to 15,000 feet high, through which its whole course must be a series of cañons 9000 to 12,000 feet deep, through which Wilcox and Cooper, both experienced travellers, passed without a word

mentioning them, and it is clear that there is something still requiring explanation here. And if to the river length given you add 40 miles for the corrected lengths from the truer position of Sama, and bring it up to 120 miles between Rima and the Kund, you have one roaring torrent with only 20 feet of fall per mile, rapids and all included.

Or if we give what must appear a reasonable fall per mile to this torrent, say 100 to 200 feet, we find it correspond in every particular with the accounts we have of it, and it is physically impossible that the Zayul-chu and the Brahmakund Lohit can connect.

Now here is an opportunity for a final test of easy application, and which, I think, every person will concede is a scientific one:—telegraph to Sadiya, and get a few observations of the height of the bed of the Brahmakund Lohit made within British territory. No danger of any kind would be incurred; and no political complications, as the Tibetan border need not be crossed. Take the heights say at 10 miles, at 20 miles, 30 and 40 miles from the Kund, and this will give an accurate knowledge of data which must prove a final settlement of the problem. If at any point the bed of this stream is higher than 4650 feet, the height of the Zayal-chu at Rima, this river cannot flow into it, and it must flow to the Irawadi, in which case perhaps A—'s evidence that the Sanpo joins the Zayul-chu may be accepted. If the fall of the Brahmakund in this mountain region beyond the Kund is for the distance above named less than 20 feet per mile, I, for one, will give up entirely the views I have hitherto been compelled to hold.

I should have liked now to have recalled and reviewed the different points bearing on the converging arguments, but I have already exceeded the limits I set myself, and must only express my thanks for having been permitted to submit my views to you.

Previous to the reading of the above paper,

The PRESIDENT said that Mr. Gordon, its author, had been connected with the Irawadi for the last twenty-one years, and had spent eighteen years on its banks in the employment of the British Government. His name had been more than once before the Society in connection with the subject of the paper. No doubt many present would recollect an interesting paper that was read by Major Sandeman on the long-contested point as to whether the Sanpo, which flowed on the northern side of the Himalayas through Tibet, constituted the head-waters of the Irawadi or of the Brahmaputra. Both views had been supported by men of great geographical authority, but of late years the current of opinion had been very decidedly in favour of the view that it flowed into the Brahmaputra. That was the opinion of Major Sandeman, and was supported in a very powerful speech by Colonel Yule, and by the former Surveyor-General of India, Sir Henry Thuillier: in fact, it had almost become a received opinion. It was quite true that nobody had ever followed the course of the Sanpo to its supposed junction with the Brahmaputra, and there was a mystery still to be cleared up, a mystery due to the extraordinary dangers to be encountered by the traveller through those barbarous regions through which the Sanpo flows. Mr. Gordon was opposed to what had become the popular view, and was entitled to a very respectful hearing, inasmuch as he was not only a

gentleman of great ability who had made a special study of fluvial hydrography, but he had taken an infinite amount of pains in looking through all the authorities, and endeavouring to ascertain how far their conclusions were founded on fact. He was sure that the members would listen to him attentively, and in a judicial and unprejudiced spirit.

After the paper,

General J. T. WALKER made the following remarks:—Through the courtesy of Mr. Gordon I was supplied last Saturday with a proof copy of the paper which he has just read to us. Finding it to be an argument based chiefly on numerical analyses of geographical distances and river discharges and rainfalls to prove that the Sanpo river of Tibet is the source of the Irawadi, whereas the papers which are ordinarily read at our evening meetings are accounts of travel in foreign regions with descriptions of the country and the people, I determined to prepare a paper to read in reply, believing that I should thus trespass less on your time and patience, and that my reply would be more worthy of record in the 'Proceedings' of this Society than any remarks I might make in the usual course of the discussions.

But before I commence to comment on Mr. Gordon's very remarkable paper, I will ask you to go back with me in thought some eighteen centuries, to the time when the Romans were commencing their conquest of Britain. Suppose a Roman geographer to have set himself at that time to make a map of England; that he had been furnished with various itineraries in detail of journeys made through the northern, the midland, and the eastern counties, and also with a mariner's chart of the south coast, but that he had never heard of the river Thames and knew nothing of the southern counties. His map might be very correct in certain portions, but it would be absolutely worthless as regards the Thames valley. For example, he might have ascertained that the river Lea rises in Hertfordshire, flowing southwards from the lowest point at which it was seen by his informant; his mariner's chart would show him the river Ouse coming from some unknown region to the north; he would notice that by a little extension of one river to the south and the other to the north they would join together, and he would probably conjecture that the Lea must be the upper course of the Ouse, and would show it as such on his map. Of course he could not represent the Lea truly as flowing into the Thames.

Now in compiling maps of Asia during the last and the present centuries certain eminent geographers have laboured under a very similar difficulty to that of our hypothetical Roman geographer, because they knew nothing or very little about the Brahmaputra river. The celebrated French geographer D'Anville produced a map of Tibet in 1733 from information derived entirely from Chinese and not at all from Indian sources; he combined his materials with great skill, and the recent surveys of the Asiatic explorers of the Indian Survey have borne testimony to the accuracy of his map of Tibet. But he seems to have had no knowledge of the river Brahmaputra and the valley of Assam, for in his map of Asia he does not show them but makes the Sanpo river of Tibet flow into the Irawadi by giving it a course through the Himalayan mountains which would make it cross the Assam valley a little below the town of Sadiya, and thus turn it into the Brahmaputra. A century afterwards the German geographer Klaproth also constructed a map of Asia, in which the Sanpo was shown as flowing into the Irawadi; he was aware of the existence of the Brahmaputra, but knew nothing of its upper sources; in order to circumvent them he took the Sanpo through the Himalayas on a line about 140 miles to the east of D'Anville, hoping thus, but vainly, to get clear of the Brahmaputra. And now this evening we again have the Brahmaputra presenting itself as an obstacle in the path of the Sanpo.

Mr. Gordon endeavours to get over the difficulty by boldly affirming that it does not exist; that the Eastern Brahmaputra, instead of being a considerable river taking its rise in the Zayul basin 150 miles to the east of the head of the Assam valley, is a small stream the sources of which are shut off by a mountain barrier from the Zayul basin; he maintains that the distance from the head of the Assam valley to the town which Tibetans call Rima and Mishmis call Roema, in Zayul, is at least 30 miles greater than has hitherto been supposed, and he says that "we thus gain a complete half degree in which the Sanpo can come down comfortably to the Irawadi." He maintains that Wilcox, who ascended the Eastern Brahmaputra for some distance above the point where it enters the Assam Valley, considerably underrated the distance of the town from his nearest point to it. In proof he appeals to a map drawn by the Khamti chief Chowsam Gohain who was sent on a mission from Assam to Rima in 1869, by Captain Gregory, the Superintendent of the Upper Assam District. Now I am inclined to agree with Mr. Gordon that the distance is greater than Wilcox inferred from native information; I find on comparing his map with that of Pandit A—k, of whose travels I gave you an account last December, that the distances between villages common to both maps in the valley leading down to Rima from the Ata-Gang Pass are 43 miles by the Pandit from actual pacing and only 32 by Wilcox from native information. I am ready to assume therefore that Rima may be 30 miles to the east of Wilcox's position, and I will go further and admit that this may afford room for the Sanpo to "come down comfortably to the Irawadi." But the comfort of the Sanpo will soon be greatly disturbed, for it will have either to take a flying leap over the Brahmaputra or to burrow under that river. Whatever doubt there may be as to the correct position of Rima, there can be no doubt whatever that the river which flows near Rima is the Eastern Brahmaputra. Wilcox declares it to be so, and the map which he constructed from native information of the branch of the river which flows from the Ata-Gang Pass down to Rima agrees so well in the positions of the villages on its banks with the Pandit's survey, that it is in the highest degree improbable that he can have been mistaken regarding the course of the river below Rima. Cooper, who reached a point a few miles higher up the river than Wilcox did, says that the Mishmi chief who accompanied him told him he had crossed it repeatedly a little to the north of Rima. The Pandit crossed it at Rima and travelled down the right bank to Sama, and was informed by the people of the country that the river, by them called the Zayul Chu, became the Brahmaputra lower down and passed into India. Captain Gregory, in his official report of Chowsam Gohain's journey, calls it the Brahmaputra; and Chowsam Gohain, the only one of our authorities who actually travelled the whole distance between Assam and Rima, shows the river on his map as flowing from the Zayul basin past Rima and down to Assam along one side of his route. Mr. Gordon accepts and adopts what is weakest in Chowsam Gohain's map, and rejects what is strongest, for as the map is merely a rude sketch, without scale, made by an uneducated semi-savage, the distances are very questionable, whereas the river is convincing.

Almost everywhere else—with one notable exception which I will presently mention—I find Mr. Gordon treats the evidence as he has done that of Chowsam Gohain: he lays hold of whatever tells in favour of his argument, and ignores whatever is against it. At last he actually allows himself to assert that the Pandit's journal proves that the Sanpo river joins the Zayul Chu, and then flows into the Irawadi. The Pandit will certainly wonder greatly when he hears this. So will Mr. Hennessey, who had the Pandit at his side almost daily for upwards of a year, while the reports and maps of his travels were under preparation. Is it possible to believe for a moment that the Pandit's work is better understood by

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Mr. Gordon, who has never seen or corresponded with him, than it is by Mr. Hennessey, who has known him intimately for many years, and has supervised the mapping of all his explorations?

It appears to me that Mr. Gordon has not succeeded in substantiating the slightest particle of evidence from a geographical point of view that the Sanpo flows into the Irawadi; on the contrary, the evidence is overwhelming that as the Sanpo cannot possibly cross the Brahmaputra it must be the upper course of the Dihong river, flowing through the Himalayas on the very line indicated by D'Anville 150 years ago, and joining the Eastern Brahmaputra a little below Sadiya.

I now turn with much pleasure to the one point where I find myself in accord with Mr. Gordon. He has made a very minute and careful comparison of the distances in the map of the Pandit's route with those in the itinerary, and has discovered that in the section between Jior and Sama the map distances amount to 150 miles, while the itinerary distances are only 134 miles, and he maintains—I believe quite rightly—that in this section the map must be wrong; he says that he has found no similar mistake elsewhere. I will now explain how such a mistake may have been made. The Pandit's route survey was by paced distances and magnetic bearings, controlled by astronomical determinations of latitude to indicate the mean pace-length in each section between two latitude stations; astronomical longitude observations were too delicate and difficult for him to undertake; thus his only external checks were the latitudes. Wherever his route lay directly north and south, the latitudes gave a good value of his paces; but wherever it lay directly east and west, it gave no value; as a general rule, when the northings and southings preponderated over the eastings and westings, the value was sufficiently exact for the requirements of the map; but when the latter preponderated it became less and less reliable, and might even be materially erroneous. In the Pandit's route from Lhasa north-east up to Chaidam, and from there south-east down to Darchendo (Ta-chien-lu) the former largely preponderated; thus the pace-length was well determined. The longitude of Darchendo, as obtained from the survey ($102^{\circ} 14'$) was excellent, falling between the two independent astronomical values, one ($102^{\circ} 18'$) by Mr. Baber, the other ($102^{\circ} 5'$) by Lieut. Kreitner, of Count Szechenyi's expedition—a marvellously good result, considering that the length of the route survey was about 1400 miles. But in the 1000 miles of route survey directly between Darchendo and Lhasa, the eastings and westings preponderated; thus the astronomical pace-lengths were not always trustworthy, and in the section indicated by Mr. Gordon the value appears to have been erroneous.* But when the several sections were put together on a map (scale 1 inch = 16 miles), a circuit of about 150 inches on the map closed with a discrepancy of only half an inch, so that the results were accepted, and the small closing error was dispersed without further examination. The only independent data available at the time, on the mapping of this portion of the survey was Gill's longitude of Batang, $99^{\circ} 28'$, by dead reckoning from Darchendo, with which the value from the survey, $99^{\circ} 33'$, was sufficiently accordant. I have, however, subsequently ascertained that Kreitner has made an astronomical determination of Batang, which is materially less than either of these values, viz. $99^{\circ} 10'$. Thus the difference of longitude between Batang and Darchendo is $2^{\circ} 41'$ by the Pandit, $2^{\circ} 50'$ by Gill

* In practice it is not actually necessary to determine the values of the pace-length for the field map can be readily adjusted to the astronomical latitudes by using a pantagraph. The late Colonel Montgomerie, in his discussions of the surveys of his explorations, usually gave the pace-length for each section, and compared the different values, as this has not been done in the present instance the pantagraph was probably employed which would account for the non-discovery of the error.

2° 55' by Kreitner, the Pandit's map giving the smallest of the three values. In the section indicated by Mr. Gordon the map distances are too great. To the weakness of the latitude control I attribute both discrepancies. Mr. Gordon's discovery brings the route survey of the Pandit into closer accord with Kreitner's astronomical determinations, and thus it is a real service to geography in this particular, though I cannot say so of his labours in any other quarter.

Mr. Gordon argues that the Sanpo river must pass into the Irawadi mainly on the grounds that many Chinese geographers say so, and that he cannot otherwise account for the vast volume of water in the Irawadi. But his Chinese geographers most probably knew nothing of the river Brahmaputra; and as regards the volume of water in the Irawadi, I am of opinion that he has greatly overestimated its amount as compared with that of the Brahmaputra, and entirely ignored the principal source from whence it is derived.

There is no higher authority than Mr. Gordon regarding the volume of water in the Irawadi in all parts of its course through British Burmah; I believe that there is no river in the world of which such accurate statistics have been obtained as of this portion of the Irawadi, and this is mainly due to Mr. Gordon's intelligent and assiduous exertions. His report on the river appears to me to be quite a model of excellence in all matters which have come under his immediate supervision; it shows the wide range of his studies in the hydrography of great rivers, and how, step by step, he found that various long accepted formulæ for calculating discharges are not trustworthy, being liable to cause errors ranging from one-third to three times the actual discharges. Mr. Gordon indicates the necessity for determining with accuracy not merely the sectional measurements of the river, but the velocities at a number of points, at the sides as well as the middle, and at different depths and near the bottom as well as at the surface; and further he lays down the important maxim that *the best estimates, when not checked by actual measurements at the time, are not trustworthy*. His report gives the mean discharges of the Irawadi at the head of the delta for every month of the year for the years 1869-79; the values are expressed "in millions of tons or cubic metres"; the corresponding values in cubic feet per second—the unit of measure with which Englishmen are most familiar—are:

Minimum, in February and March	..	..	83,000
Maximum, in August	..	..	1,275,000

Two years after the publication of his report the accuracy of his fundamental maxim was unpleasantly corroborated by the discovery that the floats he had hitherto employed to determine his current velocities were not to be relied on beyond a certain depth, and that the bottom velocities as actually obtained with the aid of electric current meters were so much less than the assumed values that all his published flood discharges had to be diminished 10 per cent., or 127,500 cubic feet per second on the mean of the ten years above given.

All honour to Mr. Gordon for perceiving that his original apparatus was not as perfect as desirable and introducing the electric current meter; but I cannot understand how it is that his experiences have not made him more cautious in calculating river discharges outside the range of his actual operations in British Burma. He tells us that he estimates the extreme discharge of the principal branch of the Irawadi at a point in Upper Burma to be over 1,000,000 cubic feet per second, from the report of a native surveyor who, he adds, saw the river from a hill distant five miles, whence he judged it to be 500 paces, or 1300 feet wide; it is the first time I ever heard of the calculation of the cubic discharge of a river from observations taken at a point five miles distant. He also estimates the extreme discharge of the Sanpo river at Chetang as 750,000 cubic feet per second, Colonel Montgomerie's estimate being 35,000 feet, for December, and Mr. Hennessey's 40,000 for October; his estimate is purely con-

jectural, yet he gives it as "conclusive evidence against the Sanpo ever reaching the Brahmaputra," and adds that "the size of the Sanpo, thus determined, exactly fits in with the requirements of the great branch of the Irawadi in lat. 26°." By a similar train of reasoning he eventually arrives at the conclusion that the extreme discharge of the Irawadi is fully double that of the Brahmaputra. But the only fairly reliable fact we have of the Brahmaputra, as derived not from conjecture but from actual observation, is that its minimum discharge at the junction with the Dihong—which I unhesitatingly assume to be the Sanpo—as derived from observations in two years, is equal to the minimum discharge of the Irawadi at the head of its delta, as derived from ten years' observations; all else is conjecture, founded, of course, on some facts, but too few to afford reliable conclusions. The discharge of the Brahmaputra may, I consider, be quite as great as that of the Irawadi, for aught that is as yet certainly known to the contrary. Mr. Gordon dilates on the importance of the science of comparative hydrography; but he overlooks the circumstance that though he has a great body of facts for the Irawadi in British Burma, he has only conjectures for the same river elsewhere, or for the Brahmaputra anywhere but in Upper Assam; facts when compared with facts may lead to sound conclusions, but when compared with conjectures the inferences are only conjectural, and do not furnish "conclusive evidence."

Mr. Gordon states that the Zayul Chu, when last seen by the Pandit at Sama, was over 600 feet wide, deep and rapid, as large as the Thames at Putney; the unsuspicious reader might suppose from this that the Pandit had seen and taken measurements of the Thames at Putney; but on the contrary, he never left India excepting to go to Tibet, he probably never heard of the Thames, and he certainly knows nothing of the Thames at Putney. Mr. Gordon then goes on to prove that the Zayul Chu cannot become the Brahmaputra, quoting various statements to the effect that the latter is a much smaller river, "but 40 to 60 yards wide," above the Brahmakund, and a little higher up, "not a stone's throw in width." This, however, is no reason; the Indus at Attock is a far larger river than the Zayul Chu anywhere; 15 miles above Attock it attains a breadth of four miles in the summer floods; about the same distance below Attock, in passing through the Nilab Gash range, it narrows to a stone's throw, at a point called the *Ghora-trap*, or "horse's leap," by the people of the country. The magnitude of a river is the product of the three factors, width, depth and velocity; and constancy of volume is maintained whenever, if one factor is diminished, the two others are correspondingly increased. Mr. Gordon ought not to have questioned the claim of the river at the Brahmakund to be a great river, for he states that it is called the Brahmakund Lohit by the people of the country, and elsewhere, in his discussion on the value of names, he says that "Lohit, like Myit in Burmese, is a name only given to a great river."

In justice to Mr. Gordon I must admit that he does not appear to be entirely satisfied with the conclusiveness of his argument that the Zayul Chu cannot be the Brahmaputra, for he suggests that observations should be made on the height of (the Brahmakund Lohit) the latter river, along its course within British territory, through the range of mountains bordering Assam, to ascertain whether the bed is sufficiently low to permit of the Zayul Chu flowing down it. But this is unnecessary, for we already have the evidence of Wilcox that he traveled up the bed of the river far beyond the British frontier, till he got beyond the range of mountains and reached a point on the river in the Mishmi plains on the eastern side which constitute a portion of the Zayul basin. We have this evidence corroborated by Cooper, who crossed the range and penetrated farther into the basin beyond than Wilcox had succeeded in doing. As for Mr. Gordon's objection to the river passing at an altitude of only 3000 feet through a range 12,000 to 15,000 feet high, the map shows it as passing about midway between two trigonometrically fixed peaks 14 miles apart, one 12,662 feet high, the other 10,486; deducting 3000 feet,

this gives ratios of $2\frac{1}{2}$ and 2 of height to 7 of base, which is common enough all over the Himalayas, and is very far from being a "something still requiring explanation."

Having now shown that the conclusions at which Mr. Gordon has arrived from his conjectures regarding the geography of the Himalayas, and the comparative hydrology of the Irawadi, the Brahmaputra, the Sanpo, and the Zayul rivers are absolutely untenable, I proceed to show that the region to which we may rightly look for an explanation of the very considerable volume of water in the Irawadi is the Indian Ocean—with its vast exhalations of moisture which are carried by atmospheric currents to the north—and not the plains of Western Tibet, which are characterised rather by a deficiency than an excess of moisture. I am of opinion that the Irawadi may derive all its volume from the rainfall over Burma and the southern slopes of the Himalayan range on the borders of Upper Burma. Mr. Gordon wholly discards rainfall, apparently because the fall at Manipur is under 50 inches per annum, and the contiguous portions of Upper Burma are "in exactly analogous conditions as to climate, rainfall," &c. Now Manipur is in the heart of what is sometimes called the Arracan range, which stretches in one long line from the Himalayas to the Indian Ocean, separating India from Burma. The rainfall there is small simply because the elevation is materially less than that of several peaks to the south which tap the rain-clouds coming up from the ocean and leave little rain to fall at Manipur. But here, at right angles to this range, another juts out which separates the valleys of Assam and Cachar, and it receives the full contents of the lower rain-clouds, and the fall is enormous, 800 inches for instance at Cherra Poonjee, while the higher clouds pass on and deposit 100 inches in the Assam valley. Now what happens in India to the west of the Arracan range is a much fairer indication of what probably happens to the east of that range in Burma than is the rainfall at Manipur. We know from Colonel Prejevalsky and others that the rainfall in portions of Eastern Tibet, above Burma, is so great that vast areas on the plateau between the Hoang-ho river and the Yang-tse-kiang are converted into a swamp during the prevalence of the monsoon rains from the Indian Ocean. And we also know that, as a rule, where heavy rain falls to the north of the Himalayan mountains, far heavier falls on its southern slopes. Thus we have good reason to conjecture that the rainfall on those slopes and in Upper Burmah must be enormous, fully adequate to account for the maximum volume of water in the Irawadi.

After General Walker's speech, the PRESIDENT said he was sure the meeting was grateful to the two eminent authorities who had stated their views upon a question which he was afraid would still remain for some time unsettled by actual exploration. Mr. Gordon had very fairly thrown out a challenge,—that if the upper waters of the Brahmaputra were at a higher elevation than the course of the Zayul river, into which he assumes the Sanpo to flow, that would settle the question. Of course rivers did not run uphill, and if the Sanpo near Rima was lower than the upper waters of the Brahmaputra, there could be no more dispute about the point. He hoped that some gifted traveller would before long be animated by a desire to solve the problem by actual travel down the Sanpo.

* * Colonel H. Yule has discussed the Sanpo-Irawadi question at various times. The following references to his publications on the subject may be deemed useful:—

- (1) Review of Huc and Gabet's *Travels*, in 'Blackwood's Magazine,' 1852.
- (2) Appendix to the Narrative of Major Phayre's Mission to Ava in 1855.
- (3) Journal of the Asiatic Society of Bengal for 1861, p. 367.
- (4) Notes to Yule's English Translation of Marco Polo, 1st ed. 1871, 2nd ed. 1875.
- (5) 'Ocean Highways,' 1872, p. 249.
- (6 and 7) 'Proceedings' of the R. G. S., 1876, pp. 239-241; 1882, pp. 269-271.
- (8) Geographical Introduction to Captain Gill's 'River of Golden Sand,' 1880; re-issued with some modification in 1884.

Lieut. Giraud's attempt to cross Africa via Lake Bangweolo and the Upper Congo.

THE Geographical Society of Paris held a special meeting on the 7th of April for the purpose of receiving Lieutenant Victor Giraud (French Navy), on his return from his journey to the lakes of Central Africa. The meeting, which was very largely attended, was held in the large hall of the Sorbonne, M. Ferdinand de Lesseps, President of the Society, occupying the Chair. After a few words of welcome and introduction from the Chairman, M. Giraud addressed the meeting.

He commenced by setting forth his *plan de voyage*. Starting from Zanzibar, he intended to reach Lake Bangweolo (sadly famous through the death of Livingstone on its shores) by the most direct route, and to explore the lake with the aid of a boat built of steel and made so as to be taken to pieces, which he proposed to take with him. From the lake he intended to navigate the Luapula, i. e. the Upper Congo, and proceed along that river as far as Manyema, crossing Lake Moero. It has been said, but erroneously, that Stanley Pool was his objective from this point; although this course may have suggested itself to him at a later period, it certainly was not in his original programme.

He chose Dar-es-Salaam as his point of departure, in order to remove the men of his caravan (numbering 120) at the very commencement from the too well-known Bagamoyo route, where it would seem that the opportunities for desertion are of daily occurrence. Throughout the whole of tropical Africa a route, he said, should be preferred in proportion as it is least frequented by caravans. At the time of his departure (19th December, 1882) the rainy season was commencing, but he had purposely selected this, the worst part of the year, in order that he might reach Lake Bangweolo during the dry season, the only time when, according to Livingstone's observations, the lake is approachable. He first crossed the country of Uzaramo, inhabited by a wretched population. Khutu, which lies to the west of Uzaramo, is from 15 to 20 days' march from the coast. Here the tropical heat of the coast commences to abate, and the breezes from the south make themselves felt. It is a pleasant district, and the natives are of a kind and conciliatory disposition. Rice is found here for the last time before reaching Tanganyika, where this product is also very scarce.

The country of Usagara, which he crossed after leaving Uzaramo, is more known, but he was compelled to take more than a month in getting his heavily charged caravan up the steep slopes with almost perpendicular summits, where his porters sometimes stopped for whole days in order to traverse half a mile along the goat-paths, some of which are more difficult than any in the Alps. All this too had to be done during the heavy rains, or the "masika," as this season is called. M. Giraud advises travellers not to take this route to Nyassa, but to cross the country along the Tabora route and then descend into Uhehe. The natives of Usagara are timorous, and flee at the approach of the traveller.

Uhehe, where M. Giraud at last arrived, is a flat country, like Ubena. The soil, however, appeared to be better watered and more fertile than that of Ugogo, which forms the northern boundary of the first of these two districts. The *hondo*, or custom of ransom, is practised here in all its most exaggerated forms, and the traveller has to pay perhaps 300 yards of cloth for a simple glass of water. These two districts including Ussango, are very rich in cattle, and are also, together with Kondé, which the traveller traversed later on, the only countries where he saw cattle. In Uhehe game is very abundant; M. Giraud had here his last meal of giraffe, for this animal is totally unknown further in the interior. One of the men of his

caravan was carried off by a lion in broad daylight at a distance of a little over 200 yards from the camp. In Ubena and Ussango the natives are less turbulent than those in Uhehe.

The traveller arrived at the base of the first chain of the Livingstone Range during terrible weather. Camps were pitched at different altitudes varying from 8200 to 9800 feet, under deluging rains, against which the tent was no protection. About the middle of the day tropical storms usually commenced, accompanied by thunder bursting in simultaneous claps in every direction, with flashes of lightning and terrible squalls such as M. Giraud had never before witnessed. He remained about six weeks in these mountains on the north of Lake Nyassa without seeing a single ray of sunshine and without being able to dry his tent. The population he found to be more warlike, but at the same time no less timid than that of Usagara.

At the base of the chain of the Livingstone range is situated the district of Kondé, small, but the most interesting of all the countries visited by the traveller. The villages are clean, the huts comfortable, and the people, who are well fed, have an air of prosperity about them. Cattle are abundant and well kept. There is also plenty of ivory, but the natives do not take the trouble to hunt for it. Having in their own country enough to support life comfortably, and being in no fear of incursions from neighbouring tribes, as they are numerous and strong enough to defend themselves with ease, they are content, and have no desire to trade with Europeans. The weather still continued so adverse (April 1883) and disheartening that M. Giraud had serious thoughts of abandoning his journey. Livingstone had said that it was madness to travel during the season of the masika. Happily, however, the sun appeared once more, and thanks to his beneficent influence all troubles and hardships were forgotten.

Twenty days were occupied in crossing the last group of mountains to the west of Nyassa, and then the traveller saw the immense plain of the Chambezi stretched out before him, while at his feet was the English station of Kiwanda, momentarily abandoned. A few more days' marching brought him to the frontier of Uemba, which he crossed. He had intended to continue his journey to the south of the Chambezi, and to engage his caravan in Bisa, but the hostility of the natives compelled him to give up this design and to cross the Chambezi and proceed to Ketimkuru, king of Uemba, to ask his protection. At the point where the traveller crossed the Chambezi, the river had overflowed and formed a shallow pool nearly seven miles broad. The crossing occupied several days, and was made with difficulty, partly dry shod, and partly in canoes. Uemba, which is situated between the four great lakes—Nyassa, Tanganyika, Bangweolo, and Moero, is the largest district the traveller traversed, and if not the richest, is the most powerful, in consequence of the warlike disposition of its inhabitants, which belong, in all probability, to the Zulu race. Ketimkuru was for the time its chief king. He appears to be always at war, although his person is by no means martial, and despite the fact that his obesity renders marching difficult. His proudest boast is that he has blotted out Bisa from the map of Africa. The slightest peccadillo in this country is punished by the loss of the nose, ears, fingers, hand, &c. The death of the king is the signal for a civil war, in which the different aspirants to the throne fight for the prize; M. Giraud learned that this is an invariable custom. The love of destruction is inbred in these savages, and lest time should modify their ferocious instincts, they invent customs and indulge in practices to keep up their pristine ferocity. Ketimkuru at first refused to allow M. Giraud to depart for Bangweolo, saying as a pretext that he would certainly die there like Livingstone. Free at last, however, our traveller directed his course to Zapaïra. He had been told (and Ketimkuru was foremost in informing him) that all the district around the lake was uninhabited, so he

determined to proceed unaccompanied by his caravan, which he decided to send to Lunda, situated a month's march from Zapaïra, while he himself (relying on Livingstone's information) hoped to be able to arrive there by water at the same time as his men. The distance between Zapaïra and Lake Bangweolo M. Giraud accomplished in four days in company with the men whom he had chosen from his caravan for the transport of provisions, &c., and also for the crew of his boat. On the 18th July, 1883, he was afloat on the lake. Kirui, the first island he visited, is the richest in cultivation, and the most thickly populated. He found that Ketimkuru had made a great mistake in stating that these districts were uninhabited. Driven from the mainland, the Wabisa, whom the king thought he had utterly destroyed, have taken refuge in these islands with their canoes, where they laugh at their former oppressor. It was at Kirui that M. Giraud learned for the first time that the Luapula issued from the south-west corner of the lake. The peninsula of Matipa, where Livingstone camped, is situated east of Kirui, and between it and the mainland. Its approaches are low and marshy. Bawara, a long strip of barren sand on the opposite side of the lake, is only inhabited in the north. The little island of Kisi, at the northern end of the lake, is the most elevated of all, but is uncultivated, or very nearly so; a few goats are to be found there. On the other hand, Kirui and Matipa are covered with villages, while the people cultivate sorghum, maize, and Spanish potatoes. South-easterly breezes sweep over the lake during six months of the year, helping to make the surrounding country healthy. The traveller was unable to discover the exact spot at which the Chambezi pours its waters into the lake, a belt of tufted reed-grasses, along which he coasted without being able to break through, prevented him from reaching the place. The Luapula issues from the lake amid similar beds of rushes, but the bed of this river is at least clear and well-defined.

The traveller launched his boat on the Luapula at Kawende, a district little cultivated, and of which the only inhabitants are buffaloes. The river measures at this point 295 feet in breadth, and 16 feet in depth. The next day M. Giraud left the river in order to explore a large lagoon situated to the east. Then began eight days of toil and hardships. Every inch of advance was attended with the greatest difficulty. Reed-grasses of enormous height formed an almost insurmountable obstacle, and the intense heat of a tropical sun made the work still more laborious. During the night extreme cold was experienced. Everywhere game was in abundance. On the eighth day the traveller found himself again on the Luapula, with the coast of Ilala, famous on account of the death of Livingstone, on the left hand. At the first rapids (August 1883) the army of Mere-Mere, king of the Waussis, stopped any further progress. Three days' fighting ensued without much bloodshed, but M. Giraud was compelled to surrender at discretion, and abandon his boat, cloth, powder, &c. The capital of Mere-Mere is twelve days' march from the spot where the fight took place. The king received him in princely fashion. The traveller found him crafty (though a young man) like all the petty potentates of Africa. The caravans from Bihé had ceased to visit his country, and in consequence the king was no longer able to dispose of his ivory. He therefore reckoned on M. Giraud to go and get rid of some of the ivory in Bihé. When the natives became too pressing and demanded the lives of the strangers, Mere-Mere endeavoured to restrain them by saying, "If you kill them, what shall we do with our ivory? what caravan will consent to visit us again?" However, he allowed M. Giraud to despatch two of his men to his caravan, which was awaiting his arrival in Lunda, the king hoping to obtain possession of the goods which the caravan must necessarily bring. In the meanwhile the king did his utmost to starve the traveller, who was forced to provide for his own sustenance, and that of his men, by means of his gun, in

spite of the wounds he had received in the leg, and was compelled to beg when St. Hubert did not favour him. Mere-Mere seemed to look upon him as a toy, and amused himself breaking his instruments, and burning all his matches, the latter being the king's favourite diversion. At last, at the end of two months, the two messengers returned, but only brought with them twenty-five men armed with guns according to M. Giraud's instructions, which he had whispered in their ears when he despatched them. The king was furious, and wanted to kill the whole party forthwith. At last, however, his wrath subsided a little, but he demanded the surrender of all the guns. Three were given up to him. On the next day he desired to have the revolvers, chronometers, and chest, &c. Indignant at so many extortions, M. Giraud made his escape by night with the thirty men badly armed and almost dead with hunger, with the view of reaching Lunda. The party reached the Luapula on the third day at a point whence a most picturesque bird's-eye view was obtained. Proceeding up the banks of the river northwards they arrived at Cazembe's town, the king of Lunda, a monarch not less absolute and despotic than Mere-Mere, but far superior to all the other chiefs by the distinction of his kingly bearing, his aristocratic manners, and the soundness of his arguments in discussion. He also tried to starve M. Giraud and his caravan, once more complete, and was constantly demanding the surrender of the chests, loads of cloth, powder, percussion-caps, and even the last thirty guns. Exasperated by these vexatious demands, the traveller gave the order to depart, threatening to pillage Lunda since Cazembe refused both to sell him provisions and to give back his guns. M. Giraud started and kept up a desultory combat as far as Moero (November 1883). This lake the traveller considered prettier and better situated than any he had seen; small rocky hills shut it in on the north. On the plain of Kalongori, along the estuary of the same name, there is abundance of game, and according to M. Giraud, two sportsmen could kill 8 or 9 cwt. (400-500 kilogr.) of game in a day. Across the plain of Kalongori M. Giraud made his way into Itahua and thence viâ Nsama arrived at Iendwe near Lake Tanganyika. All along the last part of the journey, there were evidences of the terrible famine then raging. Every morning the party came across four or five corpses lying on the route, and in the villages the living were little better than the dead. At Iendwe the traveller was received with considerate hospitality by two English missionaries, Messrs. Swann and Brooks.

Crossing the lake M. Giraud arrived, after a voyage of 12 days, at the well-known Belgian station of Karema, founded five years ago on the east coast of Tanganyika. During the five years the waters of the lake have receded to such an extent that the coast is now more than 1100 yards away from the station. The traveller received a most hospitable welcome from M. Storms, and stopped there four months (January to April 1884). He then formed the design of re-crossing the lake, and after taking in a fresh stock of provisions, of reaching Stanley Pool, crossing the great bend of the Congo. Having found boats, he descended to Kilandu in Fipa. The crossing of the lake, where the breezes from the south blow during six months of the year, and cause enormous waves, occupied a month. From Kapampa he ascended along the coast to Mpala, the second Belgian station on the coast (May 24th, 1884). If the east coast of Tanganyika is thinly populated, the west coast may be said to have no inhabitants. It was here that M. Giraud was deserted by his porters, who mutinied in consequence of news received from Manyema. They demanded from the traveller all his cloth, powder, cartridges, &c. M. Giraud was completely at their mercy. With tears in his eyes and his heart boiling with rage he was forced to yield to their demands, and flinging in their faces the things they demanded after having made them swear not to plunder anything on their route, he made preparations to descend the lake

again in order to commence his return to the coast. Having compensated, as far as was in his power, the inhabitants of the villages in the neighbourhood of Mpala for the acts of robbery committed by the deserters of his caravan, M. Giraud embarked, and arrived at Iendwe, where he again made the acquaintance of Messrs. Swann and Brooks, who were engaged in the construction of a steel vessel, for service on the lake. The route to Mambue, whence he decided to proceed to Quilimane, had already been traversed by four English travellers. It is longer than that by way of Tabora, but safer, at least it was so at the time when M. Giraud passed along it: he doubts, however, whether it is now in the same condition. After five days' march in a south-easterly direction from Tanganyika, across a country totally uninhabited (the natives having died from famine) he reached Mambue, where he found enough porters to carry his baggage, which by this time was necessarily much reduced. He was compelled, however, to engage more men than he required, because the natives refused to start along this route except in large caravans. The great chain of the Mambue mountains indicated on English maps has no existence. There are simply some rocky hills about 1200 feet high, whence large quantities of iron are obtained. From Mambue to the Nyassa range, the country presents an aspect similar to that of the plain of the Chambezi. Villages are numerous, provisions abundant, but the country is in a state of perpetual warfare. At the English station of Kiwandu M. Giraud crossed his former route. The English missionary, Dr. Bain, whom he found there, gave him a hospitable welcome.

On September 1st, 1884, the traveller arrived on the shores of Lake Nyassa at Karonga, which is situated at the southern extremity of the district of Kondé. The unhealthy character of the place has necessitated the abandonment of the design of establishing an English station there. On board the little English steamer, the *Ilala*, which carries passengers as well as cargoes, he was conveyed to the southern end of the lake. At Livingstonia (October 11th) M. Giraud made the acquaintance of Mr. Kerr, an English gentleman "of charming manners and knowledge no less varied than profound," who like himself was on his return to the coast. In coming from Cape Town Mr. Kerr had also been abandoned by his caravan. This community of misfortune formed a bond between the two travellers, and they determined to descend the Shiré together.

Animal life, as is well known, abounds on the Upper Shiré, hippopotami and crocodiles swarming the banks of the river, while game is no less plentiful. The population is also very dense. About ten miles above the cataracts of the Shiré the travellers left the *Ilala* and arrived at the little English colony of Blantyre or Mandala, which had just sustained a great loss by the death of Captain Foot. There are seven or eight European houses, prettily built of brick, and commanding about half a mile (700 to 800 metres) of the valley of the Shiré. The climate of the place is exceptionally healthy, but cultivation is difficult, and the residents have to live principally on preserved fruits, &c. The travellers departed the day after their arrival, although the news from the Lower Shiré was bad, the Portuguese being at war there with the natives, in consequence of the latter having plundered some European factories situated on the Zambesi. Having hired canoes at Katunga on the Shiré, the travellers arrived after two days' voyage at the mouth of the Ruu, where the two hostile forces were facing each other. They managed to join the Portuguese flotilla, which consisted of 100 canoes, and presented a most curious spectacle. The appearance of the river, on the other hand, was as monotonous and uninteresting as can be imagined; the eye could not rest upon a single tree.

At the end of six days M. Giraud and his companion reached the Zambesi. At this point the view becomes more extensive without, however, gaining in

picturesqueness. At Mazaro they left the Zambesi in order to enter the river Quauqua, wrongly supposed to be a branch of the Zambesi, and a voyage of five days landed them at last at Quilimane on the coast (15th November). One month later M. Giraud arrived at Zanzibar, after an absence of two years to the very day.

What struck the traveller most during his journey was the miserable condition of the natives inhabiting the centre of Africa. This state is due, he says, partly to their natural apathy and partly to the barrenness of the soil. The native, when at the end of about three months he has consumed his harvest, lives upon boiled leaves, which pigs would not eat in Europe. Dead bodies line the paths. Throughout the whole course of the journey the food supply of his caravan was a constant source of anxiety to him, and without his rifle he certainly would never have reached the end of his journey. However, a traveller must not rely too much on the assistance of his gun.

Another remarkable fact noticed by M. Giraud in tropical Africa was the increasing depopulation caused by the perpetual state of warfare, famine, and lastly, the slave trade, which the traveller is convinced will never be stopped. On an average there are not ten male inhabitants to the square mile. M. Giraud is of opinion that the native will never be induced to improve the virgin soil. He only cares about European articles in so far as they amuse him, and does not purchase them from any felt need.

The centre of Africa possesses none of the rich tropical vegetation of the coast, which is stimulated by the invigorating sea-breeze; the only trees found there are short and stunted, and do not even afford shelter from the sun. With regard to the natural riches of the soil, M. Giraud only discovered two metals—iron and copper, the last-named abounding in but two places. On the Zambesi there are one or two gold-mines, but they cannot be worked. As regards ivory, the traveller states that the elephant is pushing farther and farther into the interior, and the transport of ivory to the coast would cost more than the ivory itself; besides, in his opinion, trade in ivory will always be reserved for Arabs and Portuguese half-breeds, and can only be profitable so far as it is carried on in connection with the slave trade.

GEOGRAPHICAL NOTES.

Major Serpa Pinto's Expedition.—Recent letters from Mozambique announce the failure of this large and well-equipped Portuguese expedition in its first attempt to advance into the interior. On the 14th of February Major Serpa Pinto arrived with his Zulu escort, at Kisanga on the coast, in a most deplorable condition, the rainy season having set in whilst they were on their way northwards. They had been marching for ten days through water, in some places up to their necks, and were five days without food; the leader was suffering from fever, and one of his assistants was unable to walk, his legs and feet being one mass of ulcers. Major Pinto, after visiting Ibo, had returned to Kisanga and recruited there 250 fresh carriers. He intends in about six weeks' time to make a fresh start for the Medo country, whence it is believed he will make his way via the southern end of Lake Nyassa to Lake Bangweolo, returning thence to Quilimane.

King Mtesa's Death.—We are indebted to Colonel J. A. Grant for the following:—In the month of July 1883 there was a rumour of the death of King Mtesa of Uganda. The event was mentioned in the 'Proceedings' for August of the same year, but it was subsequently contradicted by authentic information received from Sir John Kirk. There is no doubt now, however, that this very remarkable man is dead. The clergy of the Church Missionary Society, living in Uganda, have announced that the king died on the 10th of October last. He was the thirty-fifth king of Uganda; his reign has lasted twenty-seven years, and his age would be about forty-seven. He has been more or less an invalid for some years, suffering from an internal disorder, which caused his premature death. Mtesa's name will live in the pleasant recollection of all who ever came in contact with him. He was essentially popular, and differed from all other African potentates whom we meet, read, or hear of. As a young man he was gay, bright, fond of music, a fair musician, and an enthusiast for outdoor sports, yet always sedate in court. As he became older he maintained his position with dignity, kept peace within his dominions, and showed great diplomatic skill. In his capacity as king he greatly advanced the position of his people by the welcome he gave those traders and travellers who were invited to visit him. His system of government was as strict in his extreme provinces as it was in his palace. His people were under his absolute control, yet under his severity they are perhaps the most joyous race in Africa. Mtesa has proved to be a true friend to us geographers. The first white men who ever visited his kingdom went to him from Zanzibar, asking their way to Egypt by the Nile. Mtesa yielded to their wish; thereby the birthplace of the Nile was set at rest in the outlet of the river from the Victoria Nyanza. Besides this, he befriended our countrymen on other occasions, namely, he sent a force to assist Sir Samuel Baker in Unyoro. In recognition of this service Baker gave Mtesa his word of honour that Egypt and Uganda would never be at enmity. He sent the letters of Baker for Livingstone by men on foot to a distance of 600 miles. The friendship, the hospitality he showed to Stanley can never be forgotten. Since then, five years ago, Mtesa has sent presents by his own men to our Queen and received presents in return; and he has ever given protection to those members of the Church Missionary Society who up till now have lived within gunshot of his residence. He endeavoured to restrain the cruel but traditional custom of his race by diminishing the number of wanton executions. For this he can never be forgotten; and though in civilised circles he has been called a "savage," yet all who knew Mtesa will mourn him with sadness. May his successor equal if not surpass him!

New African Expedition.—The Berlin Geographical Society has decided to send out Dr. Fischer to penetrate towards Victoria Nyanza, and thence to the region between the Nile and the Congo. He will

proceed from Zanzibar, while Dr. Oscar Lenz will make for the same region by way of the Congo. A brother of Dr. Junker has offered to contribute a large part of the expense of Dr. Fischer's expedition, one object of which will be to find out and succour the Russian explorer, as well as Lupton Bey and Emin Bey.

Morocco.—M. Henri Duveyrier has been intrusted by the French Government with a mission to carry out various studies in the physical and political geography of Morocco.

Surveys in Algeria and Tunis.—A few weeks since, under the name of "Brigades Topographiques," sixteen companies of officers and men left Marseilles for the purpose of carrying out topographical work in Algeria and Tunis; fourteen for the former and two for the latter. The work was to begin in the south of the three Algerian provinces.

M. Grandidier on the Geography of Madagascar.—At the meeting of March 16th, of the Paris Academy of Sciences, M. Alfred Grandidier read a short note on the geography of Madagascar. He referred especially to the heights which form the water-parting and divide the island into two basins of very unequal extent; the one sloping towards the Indian Ocean, the other towards the west. M. Grandidier referred especially to the former, describing summarily the character of the streams, which are generally blocked by sand at their embouchures, traversing the marshes by narrow channels, or rather flowing parallel to the coast and forming lakes, many of which are badly indicated or altogether omitted by geographers. M. Grandidier announced the early publication of a map which will contain the result of his long researches.

M. Ivanof on the Pamir.—In addition to the account of M. Ivanof's explorations, of which we published a translation in the 'Proceedings' last year (1884, p. 135), this traveller has supplied in a recent number of the St. Petersburg *Izvestiya* further particulars on the topography, drainage, and mountains of the Pamir. The chief conclusions he arrives at, after a comprehensive study of the subject, are as follows:—The name "Pamir" applies generally to the whole region lying at the sources of the Amu-daria. It does not apply to distinct portions of it, such as Great and Little Alichur, Khargoshi, and Serez [Sares]* Pamirs. These localities are known to the inhabitants by one name only, unaccompanied by the word "Pamir." The Pamir is, according to all the best authorities, and the natives themselves, a plateau so lofty that nothing but grass will grow there, a region where neither corn nor trees will flourish, and where the only inhabitants are the argali or wild mountain sheep, the yak, and some poor Kirghiz. The word "Pamir" is derived from *bam*, roof, forming, with the Persian terminal *i*, or perhaps the Kirghiz *ir*—i. e. "place," "earth,"—Pamir,

* Cf. Col. Yule's introduction to Wood's 'Oxus,' p. lxxxiv.

Pamilo. The Pamir extends in the shape of a horseshoe from north to south, i. e. from the Taldyk Pass in the Alai range to the Almayan (the upper Vakhan-daria) north of the Hindu Kush, 200 miles; from east to west, i. e. from the Kashgarian Tash-kurgan on the east, to Sardym in Shighnan on the west, about 170 miles. Within these limits, comprising an area of 67,000 square versts, the Pamir has been crossed in all directions, and surveyed on the scale of 5 versts to the inch, with the assistance of eleven positions astronomically determined. Its eastern boundary is clearly defined by the Kashgarian mountains, from which the descent is sudden to the plain below. On the north and south its limits are also well marked by the Alai and Hindu Kush ranges respectively. On the west, however, there is no such natural boundary. Here, therefore, M. Ivanof suggests adopting a line to pass through the first cultivated ground in nearly a meridional direction from Kala-i-Pandj, the westernmost point of Wakhan, through Sardym Charpan on the Khund, Sarez, Tash-kurgan on the Murghab, and Altyn mazar on the Muk-su, touching the Alai at Daraut-kurgan. Immediately to the west of such a line would lie a belt of mountainous country differing widely in all its characteristics from the grass-covered plains of the Pamir proper. With reference to the much-disputed question of a meridional Bolor range, it may be remarked that the name as applied to a distinct chain, uniting the Hindu Kush and Thian-Shan, has long since been abandoned. Geologists then applied it to the meridional upheaval of the tableland on the high authority of Baron von Richthofen and the late Professor Sévertsof, the latter of whom saw sufficient evidence to substantiate this theory. M. Ivanof's observations lead him to a contrary opinion; whilst on the other hand he confirms entirely M. Sévertsof's views on the phenomena of a glacial epoch on the Pamir, of which he found unmistakable proofs.

Port Hamilton.—The recent annexation by England in the Korean waters is not on the island of Quelpaert, but 38 miles N.N.E. of it. From the character of its coast Quelpaert would have been quite unsuited to the purpose for which an English station was wanted in these seas. Port Hamilton is completely sheltered by three islands, the largest of which is Sodo, $3\frac{1}{2}$ miles long, one mile broad, and 650 feet elevation at the highest point. The second, Sunhodo, is about half the size of Sodo and has an elevation of 783 feet. These two islands are deeply indented, their northern points nearly meeting; and the third and smaller island (Observatory Island) is situated between the south-eastern points, forming a spacious and well-sheltered harbour, about two miles long, and more than one broad, with a depth of from 9 to 12 fathoms. There is a population of 2000 souls on the island, who are entirely devoted to the cultivation of millet. Port Hamilton is 365 miles north-east of Shanghai, and 25 miles south of the Korean mainland.

Disafforestation of Russia.—In an original communication from

Odessa, on the forests of Abkhasia, in *Export* (the organ of the German Commercial Geographical Society) for April 7th, are some very startling data as to the evil results to the country generally of the wholesale destruction of its forests. The devastation embraces an area, it is stated, of 18,000 square kilometres yearly. The extensive thinning of the forests in the northern governments of Archangelsk, Olonetz, Wologda, and Perm, which greatly moderated the withering effect of the cold north winds, has seriously affected the agricultural resources of Southern Russia, and even the general aspects of the country. Sixty years ago, it is stated the grass grew thick on the steppe to the height of a man; now no trace of this grass is found; bad crops to within 200 kilometres of the coast is the rule, and out of six years five are generally rainless.

The Topography and Geology of the Hudson Bay Region.—From Dr. Bell's report of the geological work of the Hudson Bay expedition, some interesting information is obtained respecting the topography and geological formation of that region. The coast of Labrador is indented by deep and narrow fiords, and in some places is fringed with shoals extending out about five miles. In the Strait, the coast-line appears to be less irregular, the coast is lower, the hills more rounded, and the country devoid of timber, the northern limit of which barely reaches Ungava Bay. In passing northward, the land ascends until within 70 miles of Chudleigh, where a height of 6000 feet is reached; it then gradually descends to the cape, which has an elevation of 1500 feet.—The highest land of the peninsula appears to lie everywhere close to the coast, with a gradual slope westward down to the basins of the Koksoak, and the rivers emptying along the east coast of Hudson Bay. The geological formation throughout Northern Labrador and the Strait is of gneiss, most of it Huronian, but some of it perhaps of Laurentian age, accompanied by the rock formations usually found associated with such gneiss, and containing such minerals as labradorite, anorthosite, calc-spar, iron-pyrites, and mica and felspar crystals. Beaches of shingle may be seen at Stupart's Bay, at all levels, up to the tops of the highest hills in the vicinity. At Port De Boucherville the gneiss lies in island-like hummocks, the valleys being filled with boulder clay.—In considering the glaciation of the district, Dr. Bell remarks that, if the sea here was only 100 fathoms lower than at present, James and Hudson Bays would be a plain of dry land, more level in proportion to its extent than any other on the continent. The numerous rivers that flow into it would traverse this plain, after having converged into one immense river towards the eastern limits of the plateau, and would empty into the Strait near Digges, the strait remaining as a large bay, very much in its present shape.

Punta Arenas.—We find the following account of the Chilian settlement of Punta Arenas in Magellan Strait, in a letter in the 'South

'American Missionary Magazine,' from a missionary who has recently visited it. Punta Arenas is a town of 4000 inhabitants, and is of more importance than is generally imagined. By its position it is destined to become the central market of Tierra del Fuego and its islands, and of Patagonia from Santa Cruz to the south. It is surrounded by splendid lands, which contain abundant pastures, forests, and waters. A plain, slightly inclined towards the port, is backed by a hill, which protects it from the cold winds that prevail in winter, and renders its situation picturesque; its climate is reputed by the medical men of the place to be excellent. The town proper is composed of eighteen blocks of houses, separated by streets 60 feet wide, most of them macadamised. All the buildings are of oak. There are six large streets, several cafés, hotels, and shops of various kinds. The surrounding country is occupied with sixteen ranches, which possess 40,000 sheep, 6000 cattle, 2000 horses, and 2000 pigs.

The Geographical Society of Rio de Janeiro.—This new Society which is to be devoted to the study of geography and the allied sciences, with especial reference to Brazil and America in general, was definitely established at a meeting in Rio de Janeiro on the 20th of December last. The following are its officers:—*President*, Viscount de Paranagua; *Vice-Presidents*, Senhor A. J. Henriques and the Baron de Tefé; *Secretaries*, Senhores R. S. Montoro and A. A. Pereira Coruja, jun.; *Treasurer*, J. A. R. de Oliveira Catramby. The Society will publish a quarterly Bulletin.

Patagonia.—In 1883-4 the Argentine Government sent several military expeditions into Patagonia, to which were attached a number of scientific men whose researches have added considerably to our knowledge of an imperfectly known country. The full reports of these researches, when published, will be of much importance in various departments of science. Of Lake Nahuel-Huapi we already know, but in the same region, we are told, there are many other lakes, and the scientific staff have, we are assured, investigated not only the topography and geographical features of the district, but also the botany, zoology, mineralogy, geology, and meteorology. Writing of the Rio Chubut region in the beginning of 1884, Colonel D. Lino O. de Roa says:—"The zone of the territories explored is comprised between 8° and 13° 30' W. long. from Buenos Ayres, and 40°-45° 20' S. lat. More than 500 leagues have been traversed in different directions, of which 400 are in the interior of the country and 105 along the course of the Chubut, in the very heart of Patagonia. It is impossible to imagine a region more varied in feature and more difficult to traverse from the nature of the ground. From all parts rise steep peaks, with abrupt flanks, among which run narrow and deep ravines, impassable defiles, great depressions, some barren and volcanic, others covered with thorny woods, and bush. Fragments of basalt, trachyte, porphyry, quartz, and lava, cover all parts of the surface of

the ground. Yet in the midst of this volcanic country are found here and there sheltered valleys, of two, three, five, and even eight leagues in extent, covered with excellent and abundant pasturage, and watered by streams of water saturated with iron, the banks of which are bordered with an abundance of aquatic plants."

Australian Longitudes.—In a letter to the *Sydney Morning Herald* of February 21st, Mr. John Tebbutt, of the Observatory, Windsor, New South Wales, gives some definite and trustworthy data as to the longitudes of Sydney, Melbourne, Adelaide, and Windsor. The calculations have been made by Professor Auwers of Berlin, from a long series of occultations observed by Mr. Tebbutt at Windsor, checked by occultation phases observed at Melbourne at the time of the Transit of Venus, 1874. Other trustworthy observations in Australia have also been made use of, and the fundamental longitudes for Australia by the absolute method are thus, according to Professor Auwers,

	H.	M.	S.	
Sydney	10	4	49·60	East of Greenwich.
Melbourne	9	39	54·17	" "
Adelaide	9	14	20·42	" "
Windsor	10	3	20·77	" "

Geographical Bibliography.—We may remind our readers that the last Heft of each yearly volume of the 'Zeitschrift' of the Berlin Geographical Society is mainly devoted to a carefully classified list of the publications of the past year (November to November) in all departments of geography. In the part for 1884 (Heft 6 of vol. xix.) 130 pages are devoted to this subject.

Obituary.

General Sir James Edward Alexander, K.C.S.I., &c.—The death is announced of General Sir James E. Alexander, of Westerton, Bridge of Allan, at the age of eighty-two years. This distinguished officer and traveller was the son of Mr. Edward Alexander, of Powis, Clackmannanshire; he was born in 1803, and after being educated at Edinburgh, Glasgow, and Sandhurst, served with the army in India, where he was appointed by Sir Thomas Munro, Governor of Madras, adjutant of his bodyguard, taking part in the Burmese War of 1825. In 1829 he accompanied the headquarters of the Russian general Diebitsch in the war against Turkey, and made a journey in Persia. In 1830-1 he visited South America for purposes of exploration, and made two expeditions up the Essequibo and Mazaruni rivers. In 1834 he fought in Portugal on behalf of Dom Pedro. Proceeding to Capetown as adjutant to the Governor, Captain Alexander was stationed at Durban, and in 1836-7 undertook a journey on behalf of the Royal Geographical Society into the country north of the Orange river, penetrating as far as Damara-land. For this service to geography he received the honour of knighthood. His next important service was in British North America; in exploring the forests of New Brunswick he spent seven years, publishing the results in 1849, in two vols.—'L'Acadie; or, Seven

Years' Explorations in British North America.' Sir James took an active part in the Crimean War (commanding the 14th Regiment before Sebastopol), and in the campaign against the Maoris of New Zealand. For many years he had lived retired from active service, but continued to take a real interest in geography and other departments of science, as well as in all matters of social and military importance. During his annual visits to London he was a regular attendant at the meetings of the Society; and he scarcely ever missed the meetings of the British Association, in the geographical section of which he often took an active part. Sir James Alexander was promoted major in 1846, lieutenant-colonel in 1854, colonel in 1858, major-general in 1868, lieutenant-general in 1877, and general in 1882. He was nominated a Companion of the Bath in 1873. It was Sir James who obtained the Khedive's leave to transport Cleopatra's Needle to England, and it was mainly through his exertions that the obelisk was saved from being broken up; he aroused public interest in the subject, which led to Sir Erasmus Wilson undertaking to defray the cost of transporting the monument from Egypt to the banks of the Thames. Besides the work mentioned, he wrote 'Travels from India to England' (1827); 'Travels through Russia and the Crimea' (1830, 2 vols.); 'Transatlantic Sketches' (1833, 2 vols.); 'Expedition of Discovery into the Interior of Africa' (1838, 2 vols.); 'Incidents of the Last Maori War' (1863); 'Bush Fighting' (1873). While some of these are of importance in the history of geographical exploration, all of them are interesting and instructive reading.

Sir James contributed to the Journal of the Royal Geographical Society, of which he was a Fellow from 1830, the following papers:—Notes of the Expeditions up the Essequibo and Mazaruni Rivers in the years 1830 and 1831 (vol. ii. p. 65); Letters from South Africa (vol. vii. p. 439); Report of an Expedition of Discovery through the Countries of the Great Namaquas, Boschmans, and the Hill Damaras, in South Africa (vol. viii. p. 1).

REPORT OF THE EVENING MEETINGS, SESSION 1884-5.

Ninth Meeting, 23rd March, 1885.—The Right Hon. Lord ABERDARE,
President, in the Chair.

PRESENTATION.—*J. H. Kerry-Nicholls, Esq.*

ELECTIONS.—*Petrus Aganoor, Esq.; George Cowie, Esq.; William Douglas Crossley, Esq.; Frederick Emanuel Goodhart, Esq.; Captain Alexander Gordon; James Henry Kerry-Nicholls, Esq.; J. E. Muddock, Esq.; John Smith, Esq.; John R. Starkey, Esq.; William John Steains, Esq.*

The following paper was read:—

"Geographical Notes on Herat, and the Valleys of the Hari-Rud and Murghab." By Major T. H. Holdich, R.E., of the Afghan Boundary Commission. With an Introduction by General J. T. Walker, R.E., late Surveyor-General of India.

Published under the title of "Afghan Boundary Commission; Geographical Notes, III.," with map, *ante*, p. 273.

Tenth Meeting, 13th April, 1885.—General Sir H. C. RAWLINSON, K.C.B.,
Vice-President, in the Chair.

ELECTIONS.—*Alexander Begg, Esq.; His Excellency Henry A. Blake (Governor of the Bahamas); John Annan Bryce, Esq., B.A.; George Pringle Hughes, Esq., J.P.; Lieut.-General Sir Richard Meade, K.C.S.I.; Beaumont Morice, Esq.; Joseph Prior, Esq.; James Proctor, Esq.; Rev. A. E. Worthey.*

ANNOUNCEMENT OF THE ADJUDICATION OF THE ROYAL MEDALS AND OTHER
AWARDS FOR THE YEAR 1885.

Mr. C. R. MARKHAM, Secretary, read the awards as made by the Council that day, as follows:—

The Founder's Medal to Mr. JOSEPH THOMSON, in recognition of the great services he has rendered to geography, by carrying out with admirable zeal, promptitude, and success the two expeditions into East Central Africa with which he was charged by the Society; viz. that of 1878–80 (when he succeeded to the command on the death of Mr. Keith Johnston) to Lakes Nyassa and Tanganyika; and that of 1882–4, through the Masai Country to Victoria Nyanza and Mount Kenia; and for the extensive addition he has made to our accurate geographical knowledge of the regions explored.

The Patron's or Victoria Medal to Mr. H. E. O'NEILL, for his thirteen journeys along the coast and in the interior of Mozambique, during the past five years; in one of which he reached Lake Shirwa and discovered the more northerly Lakes Amaramba and Chiuta, and in another explored a new and direct overland route from Blantyre to the coast; also for his extensive series of lunar observations to fix the longitude of Blantyre, and his accurate surveys of the countries explored.

The Murchison Grant to the Pundit KRISHNA, for his four explorations made while attached to the Survey of India; and particularly for his extensive and important journey in 1879–82 from near Lhása across the high plateau of Tibet to Chaidam, and thence to Sachu and Darchendo, returning via Batang and Sama to near Lhása and India; altogether a survey of 2800 miles.

The Back Grant to Mr. W. O. HODGKINSON, for his three great journeys of exploration in Australia: 1, as volunteer in Burke and Wills' Expedition; 2, as second in command of McKinlay's Expedition from Adelaide to the Gulf of Carpentaria; and 3, in 1876–7, as leader of the Expedition which surveyed the western boundaries of Queensland.

The Cuthbert Peek Grant to Mr. J. T. LAST, for his surveys and ethnological researches in the Southern Masai, Nguru, and neighbouring countries, during his long residence at Mamboia in East Central Africa; for the valuable papers and maps contributed on those subjects to the Society's 'Proceedings'; and as an encouragement to him in his further scientific investigations.

The Honorary Corresponding Members elected the same day were also announced as follows:—Chief Justice Daly, LL.D., New York; M. Elisée Reclus; M. Maurice de Déchy, Buda-Pesth.

The following paper was read:—

"The Congo, from Stanley Pool to Mangala, and up the Bochini to the Kwango Junction." By Rev. T. J. Comber. Will be published in the June number of the 'Proceedings.'

NEW GEOGRAPHICAL PUBLICATIONS.

[By J. SCOTT KELTIE, *Librarian* R.G.S.]*

EUROPE.

Den Norske Nordhavs-Expedition, 1876-1878.—[The Norwegian North-Atlantic Expedition, 1876-1878.] XI. Zoologi. Asteroidea, ved D. C. Danielssen og Johan Koren. XII. Ditto. Pennatulida, by the same authors. XIII. Ditto. Spongiadæ, ved G. Armauer Hansen. Christiania, Grøndahl & Sons: 1884 and 1885. Imp. 4to., pp. (Pt. XI.) 119, (Pt. XII.) 84, Pt. (XIII.) 25, maps and plates. (Sampson Low & Co.)

A further contribution towards the completion of the "General Report," the former parts of which are noticed in the 'Proceedings' for 1883, at pp. 179-182 and 497.

AFRICA.

Carlyle, J. E.—African Colonies and Colonisation, with Notices of recent Annexations. With maps. Pp. 82. Glasgow, printed by Robert Anderson, 1885.

This is a separate reprint of a paper read before the Philosophical Society of Glasgow, on January 7th, 1885. Mr. Carlyle has made a thorough and comprehensive study of the whole subject of the "partition of Africa" from the earliest times down to the present day. The results are here represented with much fulness, and after a general historico-geographical introduction, arranged under the various annexing or colonising countries. The maps, prepared by Mr. Ravenstein, are Senegambia and the Coast of Guinea, scale 1:10,000,000, and Equatorial Africa from 16° N. to 20°, showing the European possessions, scale 1:23,000,000.

Keane, A. H.—Ethnology of the Egyptian Soudan. Journal of the Anthropological Institute, November 1884. London, Trübner.

A classification of the many tribes which form the population of the Egyptian Soudan, under the following groups:—Bantu, Negro, Nuba, Semite, Hamite, and Non-classified.

Langegg [Junker v.], Ferd. Adalb. [Dr.]—Alt-Kairo. Zeit. der Ges. für Erdkunde zu Berlin, 20 Band, Heft 1. Berlin, 1885.

A study, topographical, archaeological, and historical, occupying 37 pp., of Masr el-Atika, or Old Cairo, about 2½ miles south-west of the Arab quarter of the Cairo of the present day.

Schenck, [Dr.] Adolf.—Das Gebiet zwischen Angra Pequena und Bethanien. Petermann's 'Mitteilungen,' 31 Band, 1885, iv. Gotha, Justus Perthes.

This is a preliminary sketch from Lüderitzland, by Dr. Schenck, of the topography, geology, meteorology, fauna and flora of the territory recently acquired by Germany in Namaqualand.

AUSTRALASIA.

Riedel, J. G.—Der Aaru-Archipel und seine Bewohner. Map. Verhandlungen der Gesellschaft für Erdkunde zu Berlin, Band xii. No. 3. Berlin, 1885.

A welcome contribution to our knowledge of the Aru Islands by one who has studied them, and especially their inhabitants, on the spot. Herr Riedel gives the number of the islands forming the Archipelago as 12 large and 83 small. The inhabitants in 1882 numbered 32,950, among whom were 116

* Notices of books by other hands are signed with initials.—[Ed.]

Chinese and 2495 Macassarese, Buginese, and other strangers. The paper is almost entirely occupied with the ethnology of the people, their manners and customs, their beliefs and folk-lore. Von Rosenberg considers the Aruans as Sub-Papuan, intermediate between the Papuan and Malay stock, but Herr Riedel here maintains they belong neither to the Papuan nor Indonesian races, but correspond with the Australians of North Queensland; but is it not probable that these from their position have a Papuan element among them? The hair is more woolly than frizzled.

GENERAL.

Handbuch der Gletscherkunde, von Dr. Albert Heim. Stuttgart, J. Engelhorn, 1885. Bibliothek Geographischer Handbücher herausgegeben von Prof. Dr. F. Ratzel.

This volume is a serious and, on the whole, successful attempt to bring together in a handbook of 500 pages all the facts and observations hitherto collected in various quarters of the globe concerning glaciers—including many not previously published—with the theories that have been framed by scientific men during the last three centuries with regard to glacier motion, glacier action, and the nature and transformation of the substance composing glaciers in the successive stages of their progress valleywards.

Professor Heim, who is Professor of Geology in the Swiss Polytechnic and University of Zurich, an active member of the Swiss Alpine Club, and the contributor of more than twenty notices to its *Jahrbücher*, writes with considerable claims to attention as a scientific authority, and with that practical acquaintance with the glacier region and its phenomena which is indispensable to their fruitful discussion. He has not made it his endeavour to set forth any complete theory or theories, for he holds that the materials for glacier theories are still incomplete. His object is rather, he informs his readers, to bring forward the gaps in our knowledge of glaciers, which are, in his opinion, so many and important that a life of research entirely devoted to the subject would hardly suffice to fill them up. Nor does Prof. Heim commit himself finally to the support of any single hypothesis of glacier motion. He endeavours, while not concealing his own preferences, to maintain as far as possible the impartial attitude of an expositor.

This method may be a disadvantage to the student whose interest in the subject is not mainly historical. Some readers, for example, will grudge the close attention they are called on to pay to Prof. Forel's ingenious attempt to resuscitate the dilatation theory, when they find in a postscript at the end of the chapter that further experiments have compelled Prof. Forel himself to modify essentially his views. Among supporters of obsolete forms of this hypothesis we do not notice any mention of M. Violet-le-Duc's strangely self-sufficient and fantastic volume ('*Le Mont Blanc*'), which met with a congenial criticism in the pages of Mr. Ruskin's '*Deucalion*.' At the other end of the tree of "glacialists" we miss the names of Hottinger, whose claims Prof. B. Studer prefers to those of Scheuchzer, and of W. Burnet (son of the Bishop), who communicated in 1709 to our Royal Society a letter containing a crude statement of the first notions as to glacier growth. Nor does that acute observer Bordier obtain his due in a bare mention. In 1773 he not only affirmed the plastic structure of glacier ice, but also speculated on the results of infiltration and regelation and of the melting of the under surface of the ice on its bed, acting in conjunction with the preponderating influence of gravity, in producing the phenomena of glaciers; and he went on to suggest in detail the importance of minute and continuous glacier measurements. Those who are unable to procure Bordier's rare book will find the pages of it containing his views on glaciers reprinted in No. 66 of the '*Alpine Journal*.'

The collection of observations of every kind—some of them made by Prof. Heim himself, and many previously unpublished—are of the greatest value and render the book indispensable to those concerned with its subject. It is impossible, however, here to attempt to do any justice to the scientific value of the work recorded, or to enter in any detail on the topics discussed. We must

be content to indicate the general arrangement of the volume, which may best be done by copying the headings of the sections into which it is divided, adding only a summary statement of the conclusions of Prof. Heim on some of the most crucial points, and a few passing rectifications in matters more directly geographical.

The sections are as follows:—i. Avalanches. ii. The forms and types of glaciers. iii. Their sources of supply and material. iv. Glacier motion. v. Glacier dissolution. vi. The theory of glacier motion. vii. The moraines and erosive action of glaciers. viii. The geographical distribution and climatic conditions of glaciers. ix. Glacier oscillations in the last three centuries. x. Prehistoric glaciers.

"In glaciers," writes Prof. Heim, "we have to deal with imperfectly fluid bodies. Such bodies fall into two categories:—

"a. Those in which the internal cohesion is greater than the internal friction. These are (*zähflüssigen*) viscous bodies. They are plastic under pressure; under tension they diminish in section, or draw out, before they tear.

"b. Those in which the internal cohesion is less than the internal friction. These are (*dickflüssigen*) thick-flowing bodies. Under pressure they are plastic like the first class, but under tension are brittle, and when the tension is sufficiently severe, break without previous sensible diminution in section. Observations of the formation of crevasses prove that the comparison of a glacier to a viscous body is incorrect, and that it must rather be classed among thick-flowing bodies."

Again: "The motion of a glacier is to the most preponderating extent a result of gravity, and conforms to that of bodies whose internal cohesion is less than their internal friction. It arises from—

"a. Partial internal liquefaction caused by pressure, which also produces the blue-banded structure.

"b. Plasticity of the ice without fracture where it approaches its melting-point.

"c. Ruptures and slight displacements continually alternating with partial regelation, processes which are continually taking place through the entire mass and follow the boundaries of the existing glacier granules.

"d. Sliding on its bed."

On another important and much-debated topic Prof. Heim expresses himself with no lack of vigour and confidence. "Glaciation," he affirms, "is equivalent to relative cessation of valley formation. . . . Glaciers do not stamp on mountain or valley their actual form; they merely smooth and very slightly wear away the previously existing rough surfaces. A large amount of evidence conclusively establishes that glaciers only round off projections, but that streams and sub-aerial weathering have given to valleys their form, and always far surpass glaciers in the result of their action. The glacier is less of a delver or ploughman than of a carrier and rubbish-remover." Holding these views, he naturally disavows the agency of ice in forming lake-basins, a theory which the exposure of so many glacier-beds in the Alps during the last quarter of a century has severely shaken, or at least modified by the admission that the glaciers that bored basins worked under different conditions to any existing ice-streams.

On the historical oscillations of Alpine glaciers much information is collected. For these valuable documentary evidence is found in the Parish Books of Grindelwald. It must be by a slip, however, that Prof. Heim repeats the old story (not found in, but founded on an entry in, these books) that they show that babies were brought for baptism over the Mönch Joch. What the Register really shows is that one or two babies of Valaisan parentage were baptised at Grindelwald—a very different matter. Too much weight also is here (and commonly) given to the fact that glacier passes were formerly used for the passage of animals and for commerce. The old chroniclers show that the Alpine glaciers were much the same, though they were more frequently crossed, and that planks had to be used to bridge crevasses for the animals, and ropes to bind the passengers. It was worth while in those days to run greater risks than at present, because there were then *no* good roads, and there were other difficulties and dangers, now removed, in taking circuitous routes. In the Caucasus at the present day cattle-lifters and traders cross passes comparable

to the Col d'Hérens, the St. Théodule, and (we believe we may safely add) to the Col du Géant, as it was ten years ago.

A critical examination of the section on the geographical distribution of glaciers reveals the need of somewhat numerous corrections, which it would be difficult to make fully here without loss of due proportion and consequent injustice to the work as a whole. The statement which is twice repeated by Prof. Heim, and had previously found a place in Dr. Hann's 'Meteorologie' (p. 190), as to the existence in the Pamir and Thian-Shan of snowless winter pasturages at an elevation of 3000–5000 mètres, has surely arisen from a misunderstanding of the authorities (Wood and Severtsoff) quoted. Wood, at any rate, in the passage referred to, is speaking of *June*, not *January*! The sketch of Caucasian glaciers requires modification throughout. The estimate of 120 kilomètres for the ground covered by snow and ice in the whole chain—less than that covered by the Aletsch Glacier and its tributaries—is utterly inadequate. Abich estimates the glaciers of Elbruz alone as covering 2.5 German geographical miles = 141.8 kilomètres. Prof. Heim has been misled in his further statements, that the chain possesses no glaciers equal to the greater Alpine ice-streams, that most of the glaciers are of the secondary or "hanging" class, that the Elbruz group contains half of the "frosty Caucasus," that the monarch of Caucasian glaciers, the Karagam, is 8 kilomètres long and ends at 1930 mètres. The Aletsch may maintain its first place, but the Karagam will probably rank second when Alpine and Caucasian ice-fields are finally classed; the central chain for 120 miles is draped with glaciers of the first class, that is, that descend into valleys; Elbruz does not represent one-twelfth of the snowy chain; the Karagam Glacier is not eight but "at least 16 to 21 kilomètres" (Dinnik), or about 15 miles (Freshfield) in length. It ends at 1739 mètres. We must not be led further, to Spain, or Africa, or North America. In subsequent editions Prof. Heim will no doubt make the necessary corrigenda, for which in his preface he asks his readers to supply him the materials. He must also add an index, the absence of which in a work of this character is deplorable. A table of works actually quoted would also be very serviceable.

We must not conclude without expressing our conviction that in the map of the Aletsch Glacier supplied by Herr Imfeld, of the Federal Staff, already well known for his superb relief of Monte Rosa, the "ne plus ultra" of mountain cartography has been attained. By means of a skilful combination of hill-shading and contour lines it unites picturesque delineation with scientific accuracy. Such a work reflects unbounded credit on the surveyor, the draughtsman, and the engraver who have contributed to its success, and may well form a model for imitation to all map-makers who have to deal with glacier-covered ranges.—D. W. Freshfield.

NEW MAPS.

(By J. COLES, *Map Ourator R.G.S.*)

WORLD.

Terre, La—au 18,000,000 (or 246.5 geographical miles to an inch) à l'équateur, par E. Levasseur. Paris, Delagrave. 12 sheets. (*Dulau.*)

EUROPE.

Bosnien und Hercegovina.—General-karte von—. Scale 1:150,000 or 2 geographical miles to an inch. Aus den Catastral Aufnahmen und den Terrain-skizzen der Geometer reducirt und gezeichnet von den Unterdirektoren der Vermessungs-Abtheilungen. Red. von der Vermessungs-Direktion in den Jahre 1881–1884. Herausgegeben als provisor. Behilf vom K. k. militär-geograf. Institute 1884–1885. Wien. Sheets:—2. Banjaluka, Bos: Gradiška, Prnjavor.

3. Bos: Brod, Derwent, Gradacac und Brcka. 4. Bjilina und Brezovopolje. 6. Jajee und Varcar-Vakuf. 8. Janja und Zvornik. 9. Titel und Livansko Polje. 10. Travnik, Livno und Prozot. 13. Mostar und Tupanjac. 15. Ljubuski und Pocitelj. 17. Stolac, Bilek und Gacks. 18. Uebersichtsblatt. 19. Trebinje. Price 2s. each. (*Dulau.*)

France.—Carte de—, dressée par le Service Vicinal par ordre de M. le Ministre de l'Intérieur. Scale 1:100,000 or 1·3 geographical miles to an inch. Paris, 1885. Sheets:—XIV. 10. Pavilly. XIV. 11. Rouen. XV. 17. Beaugency. XX. 15. Troyes. XXI. 16. Bar-sur-Aube. XXI. 18. Montbard (est). XXII. 18. Is-sur-Tille. XXII. 19. Dijon. XXIII. 19. Gray. XXV. 21. Pontarlier. XXVI. 16. Gérardmer. XXVI. 17. Guebwiller. Price 7d. each. (*Dulau.*)

France.—Carte géologique générale de la—, à l'échelle de 1:500,000 or 6·8 geographical miles to an inch. Contenant en outre le Sud de l'Angleterre, la plus grande partie de la Belgique, Luxembourg, les Bords du Rhin jusqu'à Bonn et Francfort, l'Alsace et Lorraine, La Suisse Occidentale, le Nord de l'Italie et le Nord de l'Espagne, par G. Vasseur et L. Carez. Paris. 48 sheets. Price 7l. To be completed in 1886. Sheets Troyes, Strasbourg, and Bordeaux now ready. (*Dulau.*)

France.—Carte Physique et Géographique de la—, par R. Leuzinger. Scale 1:2,000,000 or 27 geographical miles to an inch. Verlag der Dalp'schen Buchhandlung in Bern. Price 2s. (*Dulau.*)

This is a very nicely executed orographic map of France, the topographical features being shown by a combination of colouring and contour lines, these latter being one hundred and twenty-five metres apart for the first thousand metres, and afterwards, two hundred and fifty.

ASIA.

Afghanistan.—Special Map of— and the adjacent countries connected with the Anglo-Russian difficulty. Scale 1:2,000,000 or 27 geographical miles to an inch. With 4 inset maps. T. Ruddiman Johnston, F.R.G.S. Edinburgh, 1885.

Asie Orientale.—Carte de l'—, comprenant l'Empire Chinois, le Japon, les états de l'Indo-Chine et la Malaisie. 2 sheets. Paris, E. Andriveau-Goujon. Price 3s. (*Dulau.*)

Cambodge et Siam.—Itinéraires de M. A. Pavie dans le Sud-Ouest de l'Indo-chine orientale, publié d'après les ordres de M. C. Thompson. Paris. 2 sheets. Price 8s. (*Dulau.*)

Central Asia.—Map of—, showing the boundaries of Russia and Afghanistan. By J. Bartholomew. Scale 1:6,500,000 or 89 geographical miles to an inch. G. Philip & Son, London and Liverpool. Price 1s.

Hanoi.—Carte des environs, dressée par le service topographique de l'état-major du corps expéditionnaire du Tonkin, gravée par Jérôme à l'échelle de 1:20,000 or 3·6 inches to a geographical mile. Paris, Challamel aîné. Price 2s. 6d. (*Dulau.*)

Indian Government Surveys:—

Bombay Presidency.—Deccan Topographical Survey. Scale 1 inch to a mile. Sheets No. 60 and 66. Districts Sholapur, Kaladgi, Satara, Kolhapur, and Southern Maratha Agency. No. 67. Districts Kaladgi and Satara. No. 90. Districts Belgaum, Satara, Kolhapur, and Southern Maratha Agency. Seasons 1880-81-82.—Trigonometrical Branch, Survey of India. Sheet No. 10 of Káthi-áwár (2nd edition). Parts of Jháláwád and Ahmedabad. Season 1872-73. No. 10a

(2nd edition). Parts of Jhálávád, Ahmedabad, and Rádhanpur. Season 1875-76. No. 11 (2nd edition). Parts of Jhálávád and Machhúkánta. Season 1872-73. No. 14 (2nd edition). Parts of Káthiáwár, Ahmedabad, and Gohelvád. Seasons 1868-69 and 1869-70. No. 19 (2nd edition). Parts of Bábriávád and Gohelvád. Season 1869-70. No. 23 (2nd edition). Parts of Káthiáwár, Jhálávád, and Hálár. 1 mile to an inch.—Konkan, Survey. 4 inches to a mile. District Thana. Sections $\frac{S.E.}{1,2,3,4}$ of Standard Sheet No. 79. Season 1882-3. Section $\frac{S.W.}{1,2,3,4}$ of Standard Sheet No. 79. Season 1882-83.—**Bengal Presidency**.—Central India and Rajputana Topographical Survey. 1 inch to 2 miles. Half-degree Sheet No. XIX. North. Sheets Nos. 127, 128, 131, 132, Parts of Jeysulmere, Bickaneer, and Jodhpore. Season 1882-83.—Kohat Topographical Survey. 1 inch to a mile. Sheet No. 1. Part of Akora Khattak. Season 1882-83. No. 2. Parts of Bangash and Akora Khattak. Seasons 1881-82-83. No. 3. Samilzai and part of Bangash. Seasons 1881-82-83. No. 4. Parts of Bangash, Teri Khattak, and Sagri. Season 1882-83. No. 5. Part of Bangash and Teri Khattak. Seasons 1880-81-82-83. No. 6. Parts of Bangash and Teri Khattak. Seasons 1881-82-83. No. 8. Part of Teri Khattak. Seasons 1881-82-83. No. 9. Part of Teri Khattak. Seasons 1881-82-83.—North-West Provinces Survey. 2 inches to a mile. Seasons 1879-80-81. No. 6, N.E., N.W., S.E., and S.W. Districts Muzaffarnagar and Meerut. North-West Provinces Survey. 1 inch to a mile. Nos. 20, 32 (Western portion), 178, 181, 195. Districts Meerut, Bulandshahr, and Jaunpur. Seasons 1879 to 82.—Map of the Punjab, in 8 sections. 8 miles to an inch. Republished August 1883.—Punjab Survey. 1 mile to an inch. Districts Dera Ismail Khan and Muzaffargarh. Nos. 22, 26, 27, 30, 34, 35, 38, 40, 41, 42A, 42B. Seasons 1856-82.—North-West Provinces Survey. Preliminary Map of District Moradabad and Pargana Kashipur of District Tarai, 1871-77. 4 miles to an inch.—North-West Frontier Revenue Survey. 1 mile to an inch. District Peshawur. Nos. 3 and 6. Seasons 1863-65 and 1869-70.—Oudh Revenue Survey. 1 inch to a mile. District Partabgarh. No. 166. Seasons 1859 to 61.—Lower Provinces, Bengal. District Mymensingh, 1852-57. 4 miles to an inch.—District Hooghly, Bengal. 4 miles to an inch. Taken from sheets Nos. 113, 114, 120, and 121 of the Atlas of India, containing Revenue Survey of 1856-57 and 1869-73.—North-East Frontier Topographical Survey. 2 inches to 1 mile. Nos. 3, 9, 12, 13, 14 (Preliminary). Parts of South Sylhet. Seasons 1879 to 83.—Khasi, Garo, and Naga Hills Topographical Survey. 2 miles to an inch. No. 107 (4th edition). Part of Naga Hills. Seasons 1874-76.—Shillong Sanatorium (Assam) Topographical Survey. 24 inches to a mile. Nos. 4, 7, 10. Seasons 1880-81-82.—Naga Hills District, Assam. 4 miles to an inch. Taken from Sheets Nos. 124, 125, 130, and 131 of the Atlas of India. Seasons 1866 to 1876.—**Madras Presidency**: Madras Presidency, 1883. 32 miles to an inch.—Mysore Topographical Survey. 1 inch to 1 mile. Nos. 1, 2, 4, 5, 6, 7, 8, 9, and 12. Parts of Shimoga District. No. 13. Part of Túngkúr District. No. 55. Parts of Bangalore and Mysore Districts. No. 56. Part of Mysore District. Seasons 1881-82-83.

AFRICA.

Afâr o Donakil.—Carte originale del paese degli— e regioni limitrofe tra Massaua, Aden, Zeila e lo Scioa Nord, costrutta e disegnata secondo lo stato delle attuali cognizioni geografiche da Guido Cora. Scale 1:1,500,000 or 20.4 geographical miles to an inch. Istituto Geografico Guido Cora. Torino, 1885. (*Dulau*.)

Guinea.—Karte von Ober— zur Veranschaulichung des Deutschen Kolonial-Besitzes von L. Friederichsen. Scale 1 : 2,000,000 or 27 geographical miles to an inch. L. Friederichsen & Co., Hamburg, 1885. Price 1s. 6d. (*G. Philip & Son.*)

All the possessions of European powers on the West Coast of Africa, between the first and tenth meridians of east longitude, are shown on this map; and the territory between Lomé and Little Popo, which is at present under German protection, is given on an inset map drawn on an enlarged scale.

Herero, Namaqua- und Lüderitz-Landes.—Specialkarte der Küste des—. Scale 1 : 3,000,000 or 41·6 geographical miles to an inch. Nebst Uebersichtskarte der Deutschen Faktoreien an der Westküste Afrikas und Plan von Angra Pequena. Von L. Friederichsen. Hamburg, 1885. Price 1s. (*G. Philip & Son.*)

In addition to indicating the extent of the English and German possessions between the Kunene and Orange rivers, this sheet contains an enlarged plan, with soundings, of Angra Pequena, and an inset map of the West Coast of Africa, on which the positions of all the German factories are laid down, a list being given of the firms, and the addresses of their agents in Europe.

• **Kongo-Konferenz.**—Karte von Central-Afrika im Maasstabe von 1 : 5,000,000 or 66·6 geographical miles to an inch, zur Veranschaulichung der Resultate der — und der neuesten politischen Gestaltung Central-Afrikas. Im Auftrage des Auswärtigen Amts bearbeitet und gezeichnet von L. Friederichsen, Erstem Sekretair der Geographischen Gesellschaft in Hamburg. Hamburg, L. Friederichsen & Co., 1885. Price 4s. 6d. (*G. Philip & Son.*)

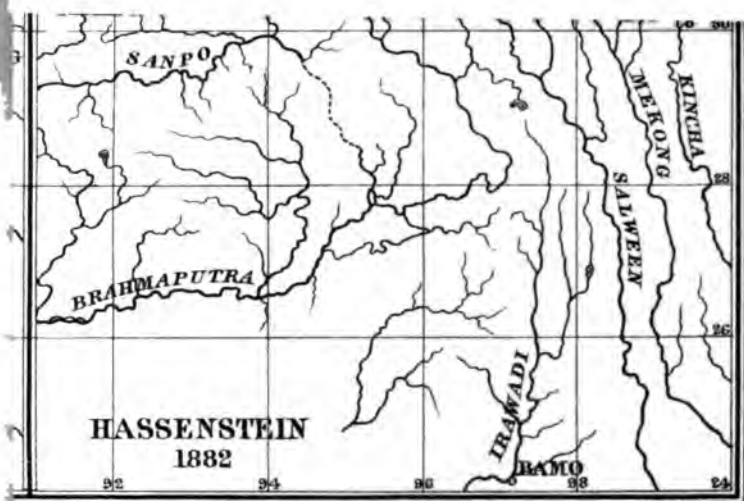
This map, which has been prepared by Herr L. Friederichsen for the German Government, and has been published in the White Book, is specially intended to illustrate the results of the deliberations of the Berlin Conference, and shows the following boundaries, distinguished by different colours and symbols:—

Boundary of the entire "Free Trade Territory," according to the Acts of the Berlin Conference, Chap. I. Art. I., including the extended zone mentioned in § 3.—Eastern boundary of the water-parting of the Congo Basin according to the same Acts, § 1 and 2. Boundary of the territory of the International Congo Association, according to the agreement with Germany, dated November 1884, having regard to boundary regulations of the Lower Congo between the International Congo Association and France and Portugal. Boundary of the territory of the International Congo Association according to the agreement with France, dated February 5th, 1885. Boundary of territory of the International Congo Association as fixed by mutual agreement, February 23rd, 1885, between this Association and Belgium. Territory under the direct protection of the German Emperor. Territory where the German flag has been hoisted at several places, regarding which the German protectorate is still under discussion. Spanish territory, Portuguese territory, French territory, and territory of Sultan of Zanzibar.

This map contains all the latest discoveries, including those of Mr. Joseph Thomson, Dr. Fischer, and Mr. Stanley's survey of the Aruwimi. The system of lettering is such as to indicate at once whether it is intended to represent the name of a tribe, a lake, or river. The map, though prepared in great haste, is fairly clear.

Westafrikanischen Küstengebietes.—Karte des— zwischen dem Alt Calabar Fluss und Corisco Bai (Kamerun, Biafra, Batanga, &c.), zur Veranschaulichung der unter Deutsche Schutzherrschaft gestellten Länderstrecken. Auf Basis offizieller Deutscher, Englischer u. anderer Materialien, bearbeitet und gezeichnet von L. Friederichsen. Scale 1 : 780,000 or 10·6 geographical miles to an inch. L. Friederichsen & Co., Hamburg, 1885. Price 1s. 6d. (*G. Philip & Son.*)

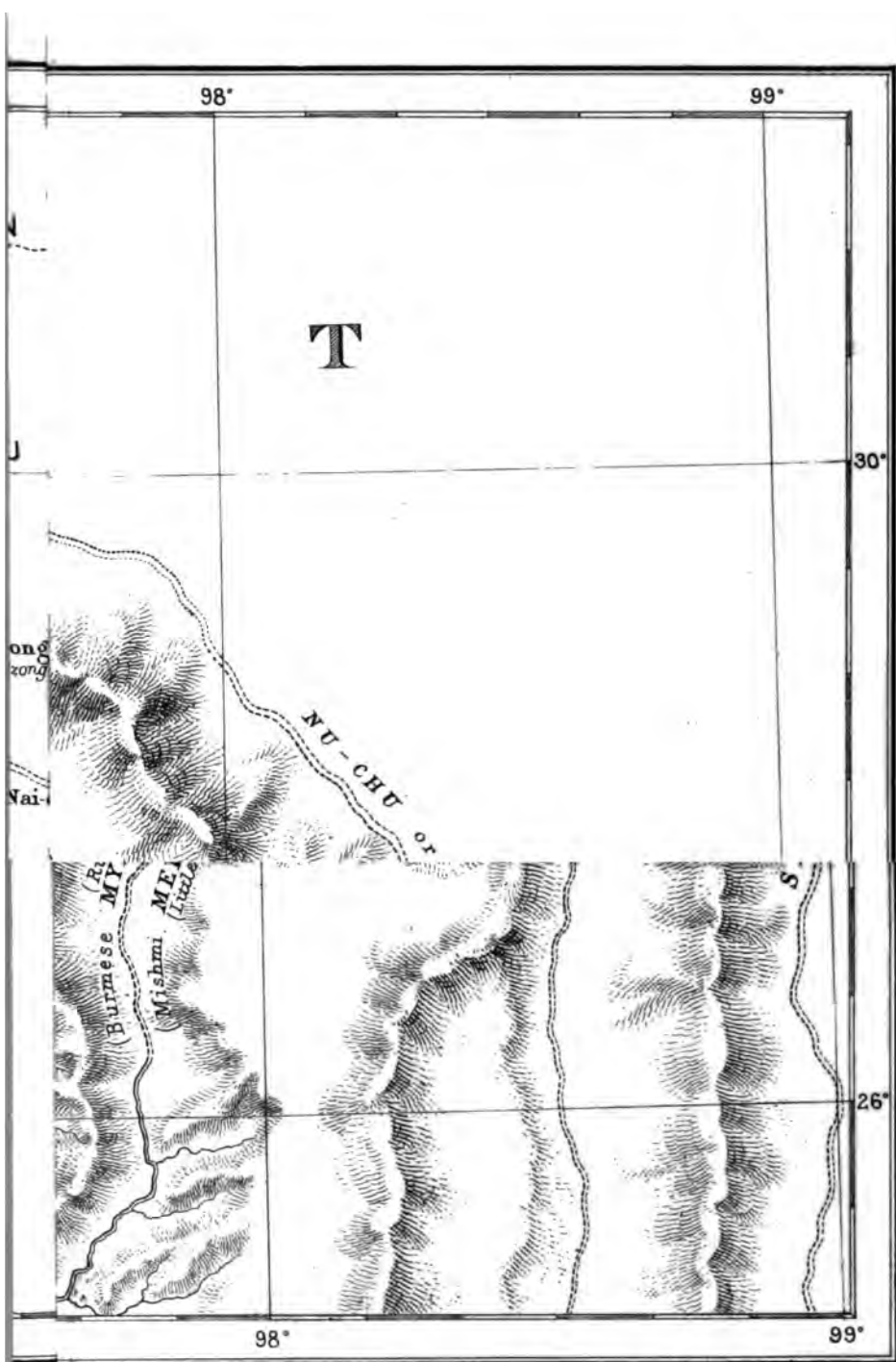




The Royal Geographical Society 1885.

Edw. Heller, lith.





E. Weller, lith., Red Lion Square



PROCEEDINGS
OF THE
ROYAL GEOGRAPHICAL SOCIETY
AND MONTHLY RECORD OF GEOGRAPHY.

*Explorations by the Revs. George Grenfell and T. J. Comber, on the
Congo, from Stanley Pool to Bangala, and up the Bochini to the
Junction of the Kwango.*

(Read by the Rev. T. J. Comber, at the Evening Meeting, April 13th, 1885.)

Map, p. 416.

THE following are notes taken on the first journey of the missionary steamer *Peace*. This steamer is the property of the Baptist Missionary Society, and was presented by Robert Arthington, Esq., of Leeds. Constructed by Messrs. Thornycroft and Co., of Chiswick, it was, after its trial trip on the Thames, taken to pieces, and shipped in plates to the Congo, and afterwards carried up, to the number of 800 loads, to Stanley Pool, on the heads of our carriers, involving a land journey of over 200 miles. Arriving at Stanley Pool in safety, it was there reconstructed and launched above the Kintamo or Puru-puru cataract, whence it made a trial trip round the Pool. Proving entirely satisfactory, and reflecting the highest credit on the builders, it started on the 7th of July last, my colleague, the Rev. George Grenfell, and myself being aboard, for a five weeks' trip. The journey was made for the most part along the south-east bank of the river, that bank being the most populous, and we being anxious to see the southern affluents. Arrived at the first important affluent, the Bochini (Stanley's Kwa or Ibari Nkutu), we ascended this river for about 100 miles, most carefully hugging the south bank, so as not to miss the Kwango, and finally found ourselves at the junction of the two rivers Kwango and Lake Leopold river. Proceeding a little way up this river, we took soundings and measurements; and returning to the Congo, we continued to ascend it as far as 1° 50' N. lat., to the town of Liboko, on the further frontier of the Mangala country. Our time having then expired, we were obliged to return to Stanley Pool.

During the first nine days of our voyage we had the pleasure of the
No. VI.—JUNE 1885.]

company of Colonel Sir Francis de Winton, Administrator-General of the African International Association, as well as other passengers going to the stations of the Association.

Leaving our station of Arthington at Leopoldville at 9 o'clock on the morning of the 7th of July, we steamed past Nshasha, and along the deep channel to the south of the great island of Stanley Pool, and anchored at night well in the narrow portion of the Congo beyond.

The Pool has been frequently described, and need not occupy our attention here. Having been three times round it and crossed it several times, we can venture to give the present outline of it with some amount of confidence. The entrance to Stanley Pool is indeed grand and striking. Steep tree-clad hills rising to a height of from 700 to 1000 feet flank its either portal, and reflecting their dark-green hues in its waters make a grand and sombre picture. Here and there a patch of grass is seen, green or yellow according to the season, relieving the dark forest. A striking contrast, however, is seen, as one looks round to the left at the glistening white sand cliffs called the Dover cliffs.

Between Stanley Pool and the Bochini or Kwa river, the Congo has a width varying from 1200 yards to two miles. It is swift and strong, and twists and swirls considerably. Navigation needs great care, on account of occasional feldspathic rocks, sometimes isolated and cropping up almost in mid-stream. The hills alter in character as one ascends, becoming more barren, and covered only with a scrubby vegetation, sloping steeply to the water's edge, where they are wooded. They also diminish in height to about 400 feet, and are much more abrupt on the right than on the left bank, where they generally rise a mile or two away from the river.

The country between Stanley Pool and the Bochini river appears to be almost uninhabited. A few little hamlets (Dui, Mpaka, and Lisa) have been found hidden away in the forest, but the only towns worthy of mention before coming to Kwa-mouth on the Bochini river are those of Ngobela (at Mswata, on the east bank) and Ganchu, almost opposite. This stretch of 70 miles is almost uninhabited, a fact which can only be accounted for by the barren and uninviting character of the country, otherwise the bold and enterprising Ba-yansi or Ba-bangi, who are sometimes somewhat pushed for room higher up, would probably come down further and occupy it.

At Mswata, where we have the jolly old chief Ngobela, described by Mr. Johnston, there is a station of the Association; and a few miles beyond, on the opposite bank, we find a station of De Brazza. About six miles beyond this again, we came to Kwa-mouth station on the Bochini river. The time taken in the journey from Leopoldville to Kwa-mouth was two days and a half, and later on, beyond to Bolobo, one day and a half, making four days for the run from Leopoldville to Bolobo. This means travelling about ten hours a day, and carrying

sufficient fuel for the whole journey. Cutting firewood for our steamer, when our first supply was finished, entailed the loss of very much time, as we did not make our crew work at night. Quite a third of the day needed to be devoted to fuelling, for us to run the remaining two-thirds. Wood for fuel we found to be easily attainable in most places. Only on the upper two-thirds of the Bochini did we have any difficulty, the forests being far away from the river bank. Nearly always we found plenty of forest, and generally, after a little search, we saw some dead timber, either lying down ready for saw and axe, or else requiring to be felled. For the future fleet of steamers which will run on the Upper Congo, it will be advisable to fell a number of trees and leave them on the ground to get dry.

The embouchure of the Bochini, Kwa, or Ibari Nkutu river we found to be in latitude $3^{\circ} 12'$ (by observation); longitude $16^{\circ} 46'$ (by account). We had not intended to ascend it on this occasion, but feeling there was still a little uncertainty as to its southern branch being the Kwango, it having been described as so small and shallow, we determined to go up to the junction, which we found to be about 75 miles from the Congo. This, on account of various delays, took us five days to accomplish.

The Bochini, for the first 30 miles, has a mean course of north-east, between steep grass- and scrub-covered sandy hills of about 200 to 500 feet in height, with narrow fringes of timber at the water's edge and in the valleys. Along this reach of the river, which has a width varying from 400 to 1200 yards, navigation requires great care on account of the many rocky reefs which stretch out into nearly mid-stream. The mouth of the river appears to be almost closed up by rocks, and the prospect for a steamer is far from inviting. After going some 30 miles up, however, the course gradually wears round into an easterly one for another 30 miles or so, and beyond the friendly town of Bau, the river takes the character of the higher reaches of the Upper Congo, widening out among sandbanks and islands into lake-like expansions of from two to five miles wide, and five to 15 miles long. In the first half of this Bochini river, navigation is troublesome on account of the numerous rocks and reefs, and in the second the sandbanks and shallow channels are equally annoying though less dangerous. In the narrow and reefy first portion of the river, the current is strong and swirly, especially round the corners, where it must sometimes run at five or six knots an hour. Soundings frequently gave five to seven fathoms close in shore. The hills on the north bank, from 400 to 600 feet high and covered with grass, at first ran steeply down to the water's edge, afterwards backing low swampy flats. On the south bank the hills are more gentle in slope, and not higher than from 200 to 300 feet.

Only a few little hamlets are met with until we come to Bau, about

30 miles up. The south bank is inhabited by Ba-mfunu, and the north, below Bau, by Ba-teke, and above by Ba-buma.

We slept the first day just below Bau, a pretty little town, embosomed in plantain trees, and where we were able to purchase some provisions; and the next day we went on to the Duma towns, and were obliged to stop there to hunt about for firewood. From this point up we had a good deal of trouble to get firewood, the broad and spread-out river being bordered for a long distance inland by grass-covered expanses, with here and there a *Hyphœne* palm, but no other vegetation, the forest being far away from the river. At Duma the river widened out into one of its lake-like expansions, and was full of grass islands and sandbanks. We could see nothing of the north bank, as we hugged the south, fearing to miss the river of which we were in search, the country was everywhere so low.

A very interesting feature of this part of the river was the little clusters of huts on the sandbanks. They were seen everywhere in twos, fours, and sixes, inhabited by Ba-buma. We asked them what they were doing on the sandbanks, and found that they kept beer-shops, and also caught fish. Their beer was made from sugar cane growing on the main-land; brought in large stone jars and calabashes, and stored in the little huts, it was sold to the *bonâ fide* travellers passing constantly to and fro on their business—trading or otherwise.

Early on the third day the river again contracted to about a mile in width, and remained narrow for a distance of about five miles, beyond which it again expanded. In this contraction, splendidly situated, is the head-quarters and chief town of the Ba-buma, and here, at her town of Mushie, reigns the chieftainess of this tribe. The scenery of this part of the river was beautiful, gently sloping hills to about 100 feet in height, and covered with grass, backing the villages, which were built near the water's edge. On the slopes behind were the farms. Mushie is quite a populous town, running about three miles along the beach in three bays; it probably contains about 2000 to 3000 people. The people were well at home on the water, and managed their canoes most dexterously, men, women, and children. We saw between one and two hundred of these canoes along the Mushie beach, some of them mere cockle-shells, and others carrying from twenty to thirty people. Immediately upon sighting us, the people tumbled helter-skelter into their canoes, and wildly and excitedly splashing one another came alongside, showing no fear whatever. Sometimes we counted as many as thirty of these canoes alongside the steamer, each canoe having something or other to sell.

A most interesting woman is Nga-Nkabe, the queen of the Ba-buma, and the first African queen of any authority that we had seen. She has a husband, a "Prince Consort," named Nchielo, but old Nchielo knows his place, and sits quietly by, smoking his pipe meekly and

philosophically while his wife rules. Queen Nga-Nkabe is a tall, stalwart woman, muscular and brawny, about fifty years of age. She certainly has a very dignified air and fine queenly pose, and there is a great deal of authority about her firmly set mouth. She is a very capable and energetic woman, of few words, who evidently knows her own mind and rules her subjects, though making but few pretensions in the way of state ceremony. Although dignified in bearing, and evidently holding a position almost unique, Nga-Nkabe did not seem to think it beneath her to take her paddle, and entering into a little canoe with another woman, to go herself to cut us a bunch of plantains.'

Queen Nga-Nkabe's great desire was to possess a double-barrelled gun, which, we not being able to give, Colonel de Winton promised he would send her. A present of various cloths, a big bell, a soldier's great-coat, and some brass evidently pleased the old lady.

The Ba-buma have always interested us greatly. They visit Kintamo at Leopoldville for trading purposes, coming nearly 150 miles, and bringing ivory, dried fish, cooking pots, camwood powder, &c., to sell for cloth, powder, guns, copper and lead for bullets, &c. They generally stay some months at Kintamo, being allotted a certain portion of the town, where they build their little huts, returning to their country when they have finished exchanging all their goods. While at Kintamo, we tried to make friends with them, and upon arrival at their country and town of Mushie we were greeted by many old friends. The Ba-buma are without exception the best specimens of the African we encountered upon our journey. They are well-formed, often nice-looking, intelligent, friendly, apparently gentle, and very industrious. Their towns swarm with children, and their domestic life is clearly happier and more to them, than is the case among Ba-teke and Ba-yansi. Seeing them in their town we were more than ever favourably impressed with the Ba-buma.

Leaving Mushie and Queen Nga-Nkabe, we crossed to the south bank and continued our ascent, still searching for the Kwango river. Every one agreed that the river divided into two above, and at Mushie we obtained the names of these two branches, the one explored by Stanley, and going northward to Lake Leopold, being called Njali Pi (Black river) or Njali Lumu, and that to the south Njali Mbe (Red river), or Njali Engela. After going south by east for another thirty miles, we at last came to the junction, where the river is characterised by swirling water, from the collision of currents and bigger sandbanks than usual. We steamed along and among the southern sandbanks, and sighting and passing a large fine town, afterwards understood to be Nga-Mkwa's town, we at last entered the Njali Mbe, Red river, or Kwango.

This river, undoubtedly the Kwango, comes from S.S.E., and is a fine navigable stream of 400 to 500 yards wide, with an average depth of two fathoms, and a mean current of a mile and a half an hour. Its

junction with the Lake Leopold river, ascended by Stanley, is in about 2° 58' S. lat. and 17° 52' E. long.

We should like to have ascended both streams, but were obliged to be contented with going a mile or two up the Kwango. The banks are low (only from five to ten feet above the water), flat, and grassy, with here and there a clump of trees. We noticed that instead of the usual four-walled houses, the natives here built round ones, very neat and symmetrical; this indicated pretty plainly that we had reached the borderland of a distinct people. And not only were these houses similar to those seen by Capello and Ivens, some 200 miles further south, but we also recognised the peculiar hat-like mode of dressing the hair as depicted in their sketches. Unfortunately we were unable to open communications with these people, as they were too nervous to reply to our questions or respond to our salutations. They simply ran along the bank, spear in hand, dodging behind the trees, as though afraid of harm we might possibly do them. By the next time we pay them a visit they will have heard of our peaceable character and lost all fear, and very likely have become as rude and overbearing as many Africans do as soon as they have recovered from their surprise at the sudden apparition of white men in their midst. Brass seemed unusually plentiful here. In Nga-Nkwa's town we could see quite a procession of women all wearing the great solid brass collar, weighing from 25 to 30 lbs. Let it be realised what being fashionable among the Ba-buma, Ba-yansi, and the Kwango natives means—carrying 30 lbs. of brass on the shoulders!

Our doubts as to this Njali Mbe being the Kwango were all set at rest when we saw its direction, size, volume, and the characteristics of its inhabitants. Livingstone crossed it in lat. 10° S., long. 18° 40' E., a point 500 miles south of where we saw it, and describes it as very swift, and 150 yards wide. Unfortunately, Capello and Ivens give us very general and bare descriptions of the Kwango, and not a single certified height of water-level. "Camped on a mount" near the Cugho in 7° 30' S. lat.; their aneroid gives 2349 feet but does not state the estimated height above the river. It is probable that there is nearly 1000 feet fall between Kiamvo's or Mwini Puto Kassongo's (near where Capello and Ivens saw the Kwango in the distance) and its junction with Lake Leopold river in 2° 58'; but this is only conjecture, for we have no reliable data to go upon. The chief of the river Kwango, Engela, or Mbe, is said to be Ngwambe (or Nga-Mbe: Nga in the Ki-teke and Ki-buma languages means owner, or possessor).

Having thus made a brief inspection of the mouth of the Kwango, we set out upon our return to the main river Congo, calling at our friend Nga-Nkabe's, and spending an hour or two there on the way. It took us only a full day and a half in accomplishing the distance down stream that had required five days for the ascent.

With regard to the longitudes of the map, and specially of the

Kwango river, they are all based on Stanley's corrected longitude of Leopoldville— $15^{\circ} 47' 30''$ —and are "by account" only. Observations have been taken, placing Stanley Pool to the west of the 15th degree of longitude. If these are correct (and they are given with hesitation, and with the feeling that they need verification), the course of the Kwango as given by Major von Mechow will be beyond a doubt the true one, and Capello and Ivens' course a degree too much to the east. At present, however, keeping to Stanley's longitude of Leopoldville, the Kwango according to the Portuguese explorers is used, and von Mechow's course shown in the map, to the westward. Throw Stanley Pool further to the west, however, and the Kwango according to von Mechow can be joined on to the part where we saw it.

It should be stated that von Mechow's map appears to be most carefully drawn, and his points fixed from a number of lunar observations. A set of observations was taken by us for longitude with a chronometer belonging to this Society, which were to be verified afterwards by a set of observations to be taken at Stanley Pool, where however unfortunately, on account of illness, the chronometer was allowed to run down.

For the first 30 miles above the embouchure of the Bochini river, the Congo runs between hills of from 200 to 700 feet in height, in a channel from one to two miles wide. It is more reefy than ever in some parts, reefs like shark's teeth running out from the points of all the bays, and the current being very strong. About 12 miles above the Bochini, and in $3^{\circ} 0'$ lat. the Lawson river enters the Congo, its mouth being distinguished by great sandbanks, and its waters of a pale steely colour.

Our first stopping-place was Chumbiri's town, one of the largest among the very numerous towns of the Ba-yansi in this neighbourhood. The son of the chief was half-drunk upon our arrival, and was very demonstrative. We were obliged to put up with his oily pretensions of friendship, and the grease and camwood powder which he transferred from his person to our clothes as he persistently took our arms and squeezed himself in between us as we walked the narrow paths of his town. The chief was said to be away up country buying ivory.

Leaving Chumbiri's, we saw about four miles beyond a remarkable stony hill, common enough in the cataract region, but conspicuous here where all the hills on both sides for the previous hundred miles had the smoothly rounded contours peculiar to the sandy ranges of this part of the continent. These hills, of from 200 to 700 feet in height, for the most part rise immediately out of the water on the right bank, while on the left bank the ascents are commenced by gentle slopes which, together with the rocky points jutting far out into the water, afford sites for the numerous towns we passed. Some of these points are extremely picturesque, and run out so far and so acutely into the water that the towns built on them front the river both up and down, but

generally these rocks are quite steep, and some run up to 30 and 50 feet in a perpendicular line, and thus afford no landing-place. The natives, however, have ample beaches and water approaches within the beautiful bays which stretch from point to point.

Soon after leaving Chumbiri's, too, we came in sight of the Lone Island, which, though apparently standing by itself, we discover as we proceed to be only the first of the countless islands which are an ever-present feature of the river from this point to Stanley Falls. Hereabouts, too, we exchange the deep water and the dangerous reefs of rocks for shallows and sandbanks, so numerous and with channels so intricate that we often lose sight of the mainland and have to rely upon our compass for the course. The current certainly tells us whether we are going up or down, but when the channel is two miles wide, to "go up" or "down" is not always sufficient. It is important to steer a straight course, and hit the right bank, and not to wander about in a maze at haphazard, and find oneself on the wrong one. After 30 miles or so among these islands and sandbanks, the hills once more approach the river, and on the slope of these hills on the eastern bank, ranging for about a couple of miles, we find the Bolobo towns, of which Ibaka is the supreme chief. On the quarter of a mile or so of debatable land which lies beyond these towns, and before reaching the Moï district, we find the Bolobo station of the International Association. With the exception of Ilebu and of the Ba-ngala towns of Liboko, we found no place containing so large a population in so small an area as Bolobo-Moï. To estimate the population is very difficult, but we think it may safely be put down as over 5000.

In Bolobo, as in Chumbiri—and indeed, having scattered themselves everywhere, right down to the cataracts below the Pool—we find the Ba-yansi, or, as they call themselves, the Ba-bangi people, all having emigrated from M-bangi, opposite Ngombe. In adjacent Moï we find Ba-nunu people, the Ba-nunu being probably the indigenous race. Inland are said to be the Ba-tende. Bolobo, as we have said above, is a town composed of about two miles of villages. Moï is rather bigger than Bolobo, and its villages, each under its separate chieftain, extend further back from the river and higher up the sides of the 100 feet hill behind them. Between Bolobo and Moï there is generally enmity, and one can generally reckon too on internal dissensions in each district, one chief of Bolobo frequently not being "on speaking terms" with his fellow chief. Although Ibaka is the special and perhaps biggest chief of Bolobo (being the white man's chief or friend), he is not by any means the only one. There are Lingenji, Yambula, Katula, Oruru, Yinga, Biangala, Itumba, &c., &c.—in all *eighty chiefs*! The main characteristics of the Bolobo people appear to be drunkenness, immorality, and cruelty, out of each of which vices spring actions almost too fearful to describe.

On the afternoon of our arrival, accompanied by Lieut. Liebrecht of the Association Internationale, we walked through all the towns of Bolobo and Moïë. In Bolobo it was a great day, a gala day, indeed. The wife of one of the chiefs had died somewhere away, and, of course, there must be four or five days and nights of orgies—any amount of dirty sugar-cane-beer swilling, unbridled license in every species of sensuality, and a grand finale of four human sacrifices, each victim being a poor wretch of a slave bought for the purpose! Drums beating briskly, circles of "fine" women, wearing the great heavy brass collar (25 to 30 lbs.!), dancing and clapping rhythmically, and plenty of people about in all the streets. The victims were tied up somewhere; of course, they would not tell us where; but were said to be apathetically and stolidly awaiting their fate—bowstring or knife—both being Ba-bangi ways of killing. Remonstrances and pleadings on behalf of these poor victims were all in vain. Another cruel tragedy was also shortly to take place. Prices of certain food were to be arranged, and, as a sign or seal of such arrangement, a slave was to be killed thus: a hole was to be dug between the two towns, and the victim's arms and legs broken, and he thrown into the hole to die, no one being allowed to give him food or drink. Very few children are seen in any Ba-bangi town, and this may easily be explained by the immorality of the people. The towns are kept large, and the population sustained, chiefly by the purchase of slaves, who frequently receive the tribal mark—two rows of raised blebs along the forehead from ear to ear. In most countries and tribes, owners of male slaves have to provide their slaves with wives; but among the Ba-bangi, it would seem that the chiefs keep an extra large number of wives, and allow their slaves permission to consort promiscuously with any of them—except, probably, the favourite ones.

The Moïë towns look very pretty from the river, many of them being very picturesquely laid out. The Ba-nunu inhabitants are at present shyer than the Bolobo Ba-bangi, and communication with them has hitherto been more difficult. The women and children (the Ba-nunu have more children than the Ba-bangi) frequently ran away at our approach; one young woman especially, whom we noticed, actually showed her teeth at us viciously, like a wild animal, as our glance turned towards her. Ba-nunu houses are built in rows of four or six, in form the same, but larger than Ba-bangi houses, a small yard between each two, but the whole row or set under one roof. A few of the houses are ornamented with human skulls, one having as many as thirteen. Circling round the bases of large trees here and there were many hippopotamus' skulls; we counted as many as thirty, showing that these people hunt (probably harpoon) the hippopotamus.

At Bolobo we got further observations for latitude, and place it in 2° 13' 0" S.

From Bolobo we steamed on past some very pretty hill scenery,

passing Moïë Mkunju and Sakimimbe, charmingly situated on spurs of rocky tree-clad hills, and prettily embowered in trees. These people seem to have picked all the best sites. For the whole of the distance to Lukolela (100 miles), we saw absolutely nothing of the opposite bank of the great river we were ascending; but, keeping somewhat near the eastern shore, and a general north-east direction, we passed among the islands in channels of from 150 to 1500 yards wide, in generally shallow water. Towns were very few, as the map will show. Hippopotami were more plentiful than we have ever before seen them; several which we shot we left for the natives to follow and tow on shore, and they must have had grand "feeds." One we sent our boat after and landed, thus obtaining fat for the engines, and any amount of meat for ourselves and people (hippo steaks, if fat, are very agreeable, as we found). We also saw three elephants, but the rate at which the *Peace* was going prevented our getting near them. On the third day, as we approached Lukolela, we found the current much stronger; and at last, the first time for 120 miles, we saw the opposite shore. Just above Lukolela the river narrows from its hitherto unknown width to a mile and a half.

The whole of Lukolela and its vicinity is densest forest, from the water's edge up its gentle slope, which reached to a height of about sixty feet. Giants of trees—cotton trees, African oak, &c.—with a girth that takes the edge off your axe almost at sight of it.

The villages of Lukolela are smaller and somewhat more scattered than those of Moïë, Bolobo, and other Ba-bangi towns below, although Lukolela people too belong to the same enterprising tribe. They differ very much, however, from their more wealthy fellow-tribesmen at Bolobo and Chumbiri, and are much milder and more pleasant in disposition.

The chiefs are three in number, two of whom have the name of Yuka, and the other—apparently the principal—Mangaba. At Lukolela we stayed two days, fixing the site for a new station, "wooding up" for the steamer, and making good friends with the people. They seemed all very glad to hear that we were coming to live amongst them, and to teach them, and the chief, Mangaba, with whom we made special friendship, promised to go on with us to Ba-ngala, to introduce us to the chiefs there.

Leaving Lukolela on the 23rd of July, we slept just below Ngombe, which we reached early the following morning. Here the river narrows again, having expanded, as usual, between the two places. Opposite Ngombe, a little above, is the M-bangi river, evidently a considerable body of water, of a light clayey, or whitey-brown-paper colour, contrasting strongly, and for many miles refusing to mix with, the dark brown water of the main river. The two bodies of water flow side by side, always with a great deal of commotion and splashing waves at their edges of contact, as if jostling each other on their way down. The same is very

noticeable, too, at the Lulongo river much higher up, the water of which flowing alongside that of the big river, is inky black.

At Ngombe, where there is a "post" of the International Association, we have a little branch of Ba-ngala people who seem to have pushed down past Ilebu, but who probably came via M-bangi. Ngombe Point is very rocky, masses of ferruginous conglomerate cropping up on the point, and forming a hill of some fifty feet high. There are plenty of people at Ngombe, and they appeared very friendly.

About twelve miles further on and we came to a splendid group of towns, Botunu, Boshende, and Ilebu. In this set of towns, especially the last two, which are separated from each other by a stretch of country of about a mile in length, we have probably the densest population yet seen by us on the Congo, not excluding Ba-ngala towns. The people literally swarmed, the crowd coming to one point of beach numbering about 500 people. Here, as at Ngombe, and in fact almost all further towns on as far as Liboko, there are isolated stretches of rocky banks where the overlying soil seems particularly fertile, and where the people have built. Sometimes this rocky bank, washed by the current, assumes the form of a squared and artificially constructed quay for distances of twenty to fifty yards. The towns, especially those of Ilebu, go extensively back, away from the river, an unusual thing, as if the suitable building land along the river front was not sufficient for the people.

We anchored off, and went ashore at Boshende, walking to the chief's house, he in turn paying us a return visit on board, and bringing a present of goat, &c. At Ilebu we slept, of course going on shore to make friends with the people. The principal chiefs are Ipaka, Mbeka, Makwala, and Mangombo, and we made special friends with Ipaka, an old man. We walked about the towns, and found each chief sitting on his stool outside his house, ready to give us a welcoming shake of the hands. Talking to the people of Ilebu and Boshende was very difficult, whether on shore or when they came to see us on board the *Peace*. There was always a deafening din of voices. Mayango, chief of Boshende, and Ipaka of Ilebu, as well as almost every friendly disposed man of importance, from Chumbiri up to Liboko, were very desirous to seal friendship by the ceremony of blood-brotherhood, which, among the Ilebu, Ba-bangi, and Ba-ngala people, is very common; but the rite is so meaningless and empty, and appears to have so little binding force, that up to the present we have always refused to drink blood with any one; and our arms, unlike those of a few upper river travellers, and notably the arms of all Ilebu and Ba-ngala chiefs, are not covered with marks and scars of blood-brotherhood.

The people about Ilebu are always spoken of as a distinct tribe, which includes Ilebu proper, Boshende, Botunu, and Mantumba, up the river of the same name. Their origin is at present, however, a little uncertain, and they are possibly immigrants, like the Ba-bangi. The

Mantumba river is only about 150 yards wide, and has been ascended by Mr. Stanley, who has found it to issue from a lake.

From Ilebu, 40 miles up to the towns of the Inganda district, we saw no signs of population. These towns, commencing from Bojungi, may be called the Congo Equatorial towns, running from about six miles south of the Equator to and up the Ruki river six miles north of the Line; and the station Mr. Stanley has established there he calls Equatorville. It is again difficult to assign the people to a special tribe, although we believe them to be indigenous.

The Congo equatorial towns are divided into districts as follows:—Bojungi, Mbongo, Inganda, and Bwangata. The population is very scattered, and many of the villages, especially in lower Inganda, consist of only a few tumble-down lopsided houses. In the Bwangata section, however, the villages were better. At the Mbongo below, the people seemed very rudely bold and troublesome, and it seemed almost as if they wanted to fight us because we would not stop and go ashore at their rocky beaches. These people about the great Ruki river (hitherto known as the Ikelemba) are the most primitive of the people we have hitherto met. They are the only people we met who use the bow and arrow. Here, too, we first saw an African shield, and found most men walking about with bow and arrows and shield, or spears and shield, or else a murderous knife, of which more presently.

They also, for the most part, wore hats of monkey-skins; the head of the animal coming to the front of their heads, and the tail hanging down behind. In spite, however, of their coiffure and arms, they did not appear wild or savage.

That they are cruel, curiously and ingeniously cruel, we know from the description given us by Lieut. Vangele, the chief of Equatorville Station, of the methods of execution obtaining amongst them. Certain victims die by the knife alluded to above, and others have to afford to the bloodthirsty spectators the pleasures of the chase. These last are given a certain start across country, and then are pursued in full cry by all the people armed with spears and bows and arrows. An obstinate victim who will not run well causes disappointment, but others are said to make a "fine run" before they fall, pierced with arrows and spears.

The death by the knife is given thus. The victim is tied down to stakes driven into the ground, in a squatting position, his arms behind him, and his head bent well forward. Round the chin and coming to a loop at the top of the head is a strong plaited rope. Four feet or so in front is a strong young sapling, which with great force is bent down until its top reaches the loop at the head of the victim, to which it is made fast. The sacrificial knife (a strange sickle-shaped affair, the hollow fitting the curve of the neck) is brought, and, after a little playing about with the miserable doomed man, a smart deft stroke is given which never fails to sever the head, which springs high in the air by

the relieved tension of the sapling. Indeed, interior Congo is one of the "dark places of the earth, full of the habitations of cruelty." We have been told that among the Ba-bangi, on the death of a chief, scores of victims are sacrificed.

Strangely contrasting with these revolting descriptions, we saw at Equatorville a very pretty little performance by children, lasting several hours, and consisting firstly of clever dancing and then of a little bit of operatic acting, after the style of a Greek play, the chorus part of which was very prettily rendered by little girls of eight to twelve years old. A strange-looking bier was carried in on the shoulders of four men. On the top of it was somebody or something covered over with red baize cloth. Sitting up at one end and looking along it was a pretty little girl, looking sad and mournful. This bier (a native bamboo bed) was placed on the ground and surrounded by the "chorus"—six little girls. A plaintive song was chanted by a woman who came to the side of the bier, which was chorused by the little girls. It was really pretty and effective; the idea of drama in Central Africa surprised us altogether. We could understand but little of the words sung, but caught the frequent repetition at the end of the chorus of "Ka-wa-ka," "he is not dead." After a time the spells of incantation were considered to have worked, and there was a noticeable heaving and shuddering in the covered mass at the girl's feet. The red cloth was drawn aside, and a girl was discovered, her chest heaving quickly and her limbs trembling as if in a paroxysm of epilepsy. Two persons came forward, and taking her by her arms, raised her to her feet. The whole was so curious for Africa that we thought it worth describing. The little performance was enacted to please the white man.

Equatorville appears to be the prettiest and best built and best kept of any of the upper International Association stations, and really reflects great credit on the chief of the station, M. Vangele, who was most kind to us. We spent a pleasant quiet Sunday here, and on the Monday morning, July 28th, continued our journey up the river. Our midday observations (we got a water horizon here as in many other places) gave us 4' 20" N. of the Equator.

The Ruki river we found to be just the magnificent affluent Stanley has described it, quite 1000 yards wide, and with several islands at its embouchure. Above the Ruki river we found the Ba-ngala towns, stretching right away to 1° 50' 0" N. (our farthest point) to Liboko, where Stanley had his great battle in 1877. We went, however, 45 miles above Equatorville before we arrived at Lulanga, the first Ba-ngala town on the eastern bank. Meanwhile, nothing was to be seen of the opposite bank of the great river we were ascending, and there was the same monotonous and uninteresting series of islands of all lengths, covered with forest, and swarming with gadflies by day, mosquitoes by night. "How I love their bosky depths," writes Mr. Stanley in describing

them. It is more than we do. What great lumps the flies raised on suffering leg and ankle as one traced one's chart, or studied the native languages in the comfortable cabin of the *Peace*! But, as Mr. Stanley explains, his love for the interminable islands of the Congo arose from the protection they afforded him from his bloodthirsty cannibal pursuers. The islands are very low, as is also the eastern bank, except just above the Ruki river, where the "terra" is really "firma," although the banks are only about four to six feet high. No grass is to be seen, and so there are no hippopotami, pasture being nil. The calamus creeping palm, with its sharp hooks, lines the banks almost everywhere, and one has often to cut through it to effect a landing, and get into the forest to cut firewood. On many trees which we cut down for fuel, we found the gum copal of commerce oozing out of, or solidified on, its bark. Coffee in plenty was discovered growing everywhere on the previous journey of July. But after leaving the Ruki river, until we arrived at Lulunga, we really saw no point on the eastern shore where a town could be built: all was so low and muddy.

At Lulunga we had our first real introduction to Ba-ngala people, and we found them by far the most boisterous, wild, noisy, troublesome, worrying lot of people either of us has ever met. We were introduced by our friend Mangaba, of Lukolela, who all the journey had made himself very interesting to us, although we have said nothing about him. Like all Ba-bangi people, Mangaba was very superstitious, and carried his fetiches with him on board. His toilet was never complete without the application of his face powder and rouge—not used, however, to improve the complexion, but to make mysterious red and white marks about his body, in which his boy assisted him. A white line up his back, from hip to left shoulder, to the left of the median line, and carried down thence along the outer part of the arm to the hand; red and white lines on the left foot, ditto across forehead, all drawn with the most religious care.

Old Mangaba was very active in communicating with the people, shouting at every canoe we met, and that long after they had ceased to hear what he said. He seemed to claim kinship with almost every one, found that he had a wife at every town we stayed at, met at least three mothers, and introduced nearly every chief of importance as his own father, until his family tree was, to say the least, perplexing.

Lulunga is very populous, perhaps as much so as Ilebu proper. Altogether, going and returning, we spent two good days at this place. The towns are built on the top of a 50 feet hill, composed of conglomerate iron, as at Ngombe, Ilebu, &c., masses of which cropped out on the beaches. We, of course, walked about in the town accompanied by large crowds of people. A wild lot they evidently were, especially one old chief, Ikafaka by name.

They swarmed out to the steamer in good canoes, and crowded on

deck, almost taking possession. The difficulty was to get the noisy rowdy lot back in their canoes, and not even our steaming ahead a little, or blowing our whistles, would induce them to leave us. A dozen canoes would hang on to the sides of the steamer, even when we were fully under weigh. There was no fear on their part. Once we half feared, from their wild noise and the beating of a sort of signal gong, that they might attack us and seize the steamer. Any little indiscretion on the part of any of our people might have led to grave results, as most of our unruly guests were armed with spears and knives. We had to exercise the greatest tact, keep a most constant genial, good-tempered manner, faces wreathed with perpetual smiles, until even the facial effort was quite a strain; and we felt intensely relieved when we were under weigh again—the last canoe left behind. One of us immediately went down with a slight fever after the excitement at Lulanga.

We found here, just above Lulanga, a considerable river. It is called the Lulongo river, and is about 700 yards wide; the water being inky black. There is a town up this river of the same name.

From here to Liboko, the last of the Ba-ngala towns, is 80 miles, and we were surprised to find it nearly two degrees north of the equator. Mangaba informed us that Ba-ngala was divided into five districts; Lulanga and Bolombo on the left, and Mungundu, Bukolela, and Loboko on the right bank.

About 12 miles above the Lulongo we crossed over to the other side of the river, thus obtaining an idea of its width (about four miles) at this place. We passed three Bukolela towns—Lobengo, Munsembe, and Bombimba, each one built on one of the few raised plots here and there obtaining on the banks. These banks were of clay, and from four to six feet above the water. Along the beach were broad double ladders, a sort of landing steps reaching down into the river. The people here seemed quieter and milder and quite ready to welcome us.

At last, on the 1st of August, we reached Liboko, and after steaming along seven miles of towns, more or less close to each other, we came to that of the great chief Mata Mayiki (i. e. many guns), where the International Association has built a station.

The chief of the station is Lieut. Coquilhat, who seems to manage the people very well considering their wildness. One fancied that a certain maniacal, irresponsible sort of wildness showed itself in their eyes. Here it was that Stanley had his great battle in 1877, when 63 canoes came out to attack him, and for five hours he had to sustain the fight. The brave young chief mentioned by Stanley was Mata Mayiki's son, who afterwards died from his wounds. The old chief was a fine looking, tall fellow with failing sight and vigour. The people crowded on the beach, most of them armed, with the idea (so M. Coquilhat afterwards informed us) that we were enemies, and prepared to fight us. In the first place,

our flag was strange to them, and they have got to understand that flags are very significant; secondly, we did not steam right close into the beach as Stanley's steamers had always done, being smaller, but anchored as usual 50 yards from the shore; thirdly, we had two Ba-ngala men on board from a capsized canoe, and they fancied these, their two countrymen, were prisoners.

All was explained, however; we came in closer, just to oblige them, and made fair friendship with them. Thanks to M. Coquilhat's very kind and efficient efforts, and acting on his suggestion, not to permit any one but chiefs and principal men on board the steamer, we did not have to endure again the worry and almost siege of Lulanga. We stayed a day here, and walked into the town, which was better arranged than any Ba-ngala town we had yet seen. Although said to be great traders, we saw no signs of wealth at Liboko, scarcely a gun, no brass ornaments, and very little cloth, all the women wearing a thick fringe, dyed various colours, round their loins, which was very becoming, and the men, many of them, wearing bark cloths. Their tattooing is not so extensive as the Ba-bangi's, being transverse raised lumps down the centre of the forehead to between the eyes, rosettes from the eyes back to the ears, and also down the middle of the breast-bone. Other people, however, living at Ba-ngala, and hailing from an interior country called Ngombe, are hideously tattooed with great raised lumps down the cheek-bones. The Ba-ngala, like the Ba-bangi, universally pull out their eye-lashes. Their language is probably much the same as that of the Ba-bangi, although many words are different. But our time did not admit of our giving much attention to the language. Nor did it admit of our continuing our journey further, although there seemed to be no difficulty so far as the people are concerned.

In closing this paper I should like to make a few general remarks.

And first, with regard to the Congo as a highway into the interior. It will be seen by our journey that when once we have got above the cataracts at Stanley Pool, there is no serious obstacle to navigation, at any rate as far as Liboko and Ba-ngala. Not only thus far, but away another 500 miles to Stanley Falls, the river is free from difficulty of navigation. For the most part, as I have stated, wood fuel is abundant. The interminable islands, and also the banks for the most part are covered with thick vegetation and forests. No coal has as yet been found.

The people are a little wild and want managing, but at no place did they attempt to molest us, or to hinder our going forward. Food is abundant and cheap. We were sometimes almost glutted with it. The people are populous in certain places suitable for towns. Sometimes great tracts of country, extending for 50 miles along the bank, are uninhabited. These are covered with thick virgin forest, in which oil-palms, coffee, copal-trees, and probably rubber are growing almost inexhaustibly. After passing one of these empty and low-lying tracts of

country, one suddenly comes upon a big town (as Congo towns go), built on ferruginous soil, the bank being from six to 50 feet above the river. So common is this, that generally when we saw ferruginous conglomerate cropping up, and the bank running higher, we expected to see a town, and were scarcely ever disappointed. The people would probably spread more if the country were more suitable.

According to present theories, such luxuriant vegetation must make the country unhealthy. The facts as to health are these. First; in the delta, at Banana, Mboma, Mukimvika; and on the coast near the river—Cabinda, Landana, and Loango—there are a large number of Europeans of all nationalities, generally traders, who for the most part appear to be almost always well, as if they had a charm against the fevers. They stay out for five or ten years at a stretch, and live as well as in Europe. Secondly; in the cataract region of the Congo, between Vivi and Stanley Pool, some two hundred Europeans have been living during the past six years, of whom a large percentage, perhaps 25 per cent., have died, generally from fever. Thirdly; a number of Europeans, perhaps thirty, have been living or travelling on the Upper Congo, between Stanley Pool and Stanley Falls; with the exception of one instance, no death has occurred from sickness, and most of them have enjoyed good health.

There is little doubt that the heavy mortality in the second instance has been due in part to the exposure and fatiguing work undergone in travelling, building, &c. This will be very greatly lessened when a railway is constructed, and more skilled labour introduced or developed.

I cannot finish without recording the great assistance we have derived from the work of Mr. Stanley on behalf of the African International Association (now the Congo Free State). Were it not that Mr. Stanley's powerful expedition had gone before us, it would have been impossible, humanly speaking, to have built and launched our steamer on the Upper Congo, and to have made the journey herein described. We gratefully acknowledge our great indebtedness to the work of the Association. To the liberality and philanthropy of His Majesty the King of the Belgians, mission enterprise on the Congo owes very much, and we are desirous most earnestly and sincerely to express our grateful acknowledgments to His Majesty King Leopold, and also, personally, to Mr. Stanley.

In introducing the foregoing paper,

The CHAIRMAN (Sir Henry Rawlinson) said that Mr. Comber was well known to many of them. He appeared before the Society six years ago, and read an interesting paper describing the inland slopes of the Cameroons Mountains, a district which had since become of wide public interest in consequence of the German annexations. Mr. Comber had been for eight years in West Africa, and had a great deal of personal experience of the country. When he first went to the Congo, before Mr. Stanley's time, it was not possible for a traveller to force his way along the river, and his first

attempts to reach its banks above the Yellala Falls were by land from St. Salvador. Two of his colleagues, Crudgington and Bentley, were the first to reach Stanley Pool, after Mr. Stanley had been some time at work in providing stations and constructing a road past the falls. Mr. Comber followed in due course. The important journey of which he was about to give an account was up the river from Stanley Pool, a distance of about 400 miles, and up the southern tributary into which the Kwango discharged its waters. During the whole journey, he and his companion Mr. Grenfell had carried on a series of observations, which had not yet been fully worked out, but which promised to yield most valuable data for constructing a chart of that large section of the river. Mr. Comber's expedition was carried out in a steamer called the *Peace*, which was supplied to the Missionary Society by that munificent patron of geography and missionary enterprise, Mr. Arthington of Leeds. The Congo was now becoming one of the most important regions politically, geographically, and commercially in the "Dark Continent," and was a great centre of attraction.

After the paper,

Sir FREDERIC GOLDSMID said that his travels on the Congo did not extend to even 5° below the line, while those of Mr. Comber had already reached to 2° above the line. He would therefore be guilty of great presumption if he made any remarks in detail on the journey into a region he had never seen. One privilege of African travel, however, he had shared with the lecturer. Like him, he had met with a queen—at Isanghila. He remembered her as a lady wearing a very bad man's hat and smoking a very common clay pipe. She came to him with a very small present and took away a large one. Her habit was to come frequently to his Belgian post and repeat this operation. When he was out there he heard a great deal about Mr. Comber and the Baptist and Livingstone Inland Missions. There were many members of both those Missions, who not only ministered to the spiritual wants of the people but also to the intellectual wants of their brethren at home. When Mr. Comber returned to the Congo he hoped he would have every success, and be able to come home again with further information on that interesting region. With regard to the work done by the International Association he thought it had hardly yet been properly appreciated in this country. A very large extent of land was now called the Congo Free State. That State was in its infancy, but in time it would become well known to England and other parts of Europe, and no doubt a great deal more would be made of it than could at present be anticipated.

Mr. JOHNSTON wished to add a small tribute of gratitude to Mr. Comber on a point that had not previously been touched upon. Mr. Comber had been too modest to say anything about one great service he had rendered, not only to natives, but also to the Europeans on the Congo, and as Sir F. Goldsmid had not noticed this part of his work, he (Mr. Johnston) would like to mention how much the Europeans on the Congo owed to Mr. Comber as a doctor. He believed that for more than a year after Leopoldville was established, Mr. Comber was the only doctor there to whom Europeans could apply, and many lives were saved by his care. Before going out to the Congo he studied in one of the London Hospitals, and for three weeks he visited him (Mr. Johnston) every day when he happened to be ill. He quite agreed with the remarks in the paper about the health of the district. Near the sea the Europeans had good health, but about Stanley Pool there was a great deal of sickness, owing to the privations that had to be undergone. Among other things, very painful ulcers seemed to afflict almost everybody, and in their cure Mr. Comber was very successful.

Mr. DELMAR MORGAN said almost the last time he saw Mr. Comber was at Leopoldville on Stanley Pool, when he had an opportunity of seeing what he was

doing as a medical missionary. He visited with him the village of Kintamo, and the well-known chief Ngaliéma who was at the time suffering from headache. The chief wore a piece of red cloth and red feathers round his head, and explained to Mr. Comber that they formed a fetish or charm to cure the sickness. When he was at Stanley Pool, and had no means of continuing his journey by water, he had to thank Mr. Comber for the loan of an excellent whale-boat, in which, in company with Mr. Grenfell, he circumnavigated the Pool. That sheet of water was known to the Society chiefly through Mr. Comber who wrote an article upon it some time ago which was published in the 'Proceedings.' With regard to the observations for latitude and longitude, of course there were great difficulties to be encountered in carrying chronometers up to those regions, but he believed that the latitude had been ascertained with comparative accuracy. On the map suspended before the meeting, the course of the Congo was carried 2° north of the equator, which was farther north than he had seen it on any other map. No doubt Mr. Comber's observations would be tested by the Society, and compared with the results of Mr. Stanley's observations, which would appear in the map in the book about to be published.

Mr. GUINNESS said it was worth while to call attention to the analogy between the proposed railway to connect the Upper Congo with the sea-coast, and the line now in process of construction to the Upper Nile. The Upper Nile is separated by long distances and by cataracts from the Mediterranean and European civilisation, and in the same way the vast and populous region of the Upper Congo is separated from the sea by 200 miles of cataracts. In one case the line had been begun to be laid down, and preparation for the other had been commenced. It was intended to connect the Atlantic with the Upper Congo, and the Red Sea with the Upper Nile, and thus to open both ends of the populous region of Central Africa. In speaking of this double movement, he could not help thinking of Livingstone, whose explorations in the interior of Africa unquestionably gave rise to the opening up of the whole of the Congo region, and of Gordon who did so much in the Upper Nile. It might perhaps be interesting if he alluded to the labours which had been gone through during the last four or five years in connection with the reduction of the Congo language to a grammatical and written form. In the British Museum he obtained a copy of a grammar of the Congo language in a Latin form published some 200 years ago, but of course it represented no spoken language. He had it translated and published, but it had not been found of much use towards the acquisition of the modern spoken languages. The Livingstone Inland Mission had sent out fifty missionaries during the last seven years, and those missionaries had set to work to acquire the dialects. Henry Craven was the first to make much progress. He was one of about twenty missionaries who had laid down their lives in the attempt to penetrate the Congo. About five years ago, when Mr. Craven returned to this country in ill-health, it was thought to be a good opportunity to attempt to reduce the language to a grammatical form. Search was made in the British Museum for Congo words, and the result was the discovery of a dictionary in manuscript containing some 10,000 words of a dialect spoken to the north of the Congo, but it differed so much from those spoken in the Congo region as to be of very little use to the missionaries. Then 500 words were found in one work and 1000 words in another. Vocabularies were furnished by the missionaries. Seven Congo natives were brought over to this country, where they remained four years. Every word was verified before acceptance, and with their assistance a grammar had been prepared and a dictionary of 250 pages; and within the last two weeks they had sent to press another dictionary representing the Ba-teke language spoken at Stanley Pool. The missionaries connected with the Livingstone Inland Mission had stations extending from the mouth of the river to the equator, and Dr. Sims, a medical man

who represented the Mission in the interior, had gone on to Stanley Falls. There were mission schools at all the stations, and as a rule, the missionaries had been kindly received by the natives. There were now seven steamers on the Upper Congo. Maps had been published by the International Association, representing the delimitations of the Congo region as agreed to at the Berlin Conference. The territory conceded to France included a large number of stations which were planted by the International movement, but they had been transferred to France for the sake of peace. A large portion to the south, near the mouth of the Congo, had been conceded to Portugal, which had had dealings with that neighbourhood more or less for upwards of 400 years. The portion belonging to the International Association skirted both banks of the river for more than 2000 miles, and the Association had obtained a fair outlet at the mouth on the north bank. The Congo Free State embraced a considerable portion of the river on the north bank up to Stanley Pool, and where it had not the north bank, it had the south. Slavery was prohibited there, and free trade was guaranteed, while all religious movements were placed on an equal footing. He hoped that efforts would be made to suppress the drink traffic on the West Coast, and the free sale of gunpowder. It was exceedingly painful to those who had the moral and spiritual benefit of the people at heart, to see large quantities of rum and gunpowder sent out there.

In reply to questions by Admiral Sir ERASMUS OMMANNEY with regard to the vegetable and mineral resources of the country, the food of the people, and the commercial advantages of the Congo region,

The Rev. T. J. COMBER said the produce of the country suitable for export consisted of ivory, rubber, ground-nuts, palm-oil, coffee, and a few other things. At present the country in the interior was undeveloped. He found coffee growing wild everywhere, but the people in the cataract region knew nothing of its value. Higher up the river he saw gum copal, but the natives did not know anything of the value of that either. Palm-oil grew everywhere, but owing to the great distance and want of transport it was not at present worth while bringing it down to the coast. When the railway was carried to Stanley Pool, and steam communication was opened up on the upper portions of the river, these products could be gathered and brought down to the coast. The cereals consisted simply of ordinary maize, and sesamum at a few places high up the river. The people ate the cassava, the plantain, the sweet potato, and the banana. Among the animals which were eaten were fowls, pigs, goats, and sheep. There was no rice except what the missionaries introduced, and the fruits were very scant indeed. There was scarcely any indigenous edible fruit; the banana having been introduced, and also the pineapple, which grew luxuriantly all over the country. The wild animals were the hippopotamus, the crocodile, and, in very fertile valleys, elephants. One member of the Livingstone Inland Mission had shot twenty-five elephants, bagging seven one morning before breakfast. Buffaloes and various species of antelopes were also to be found. No rhinoceroses or lions were to be seen. The leopard was frequently found, but snakes and other reptiles were not very troublesome. In some parts the country was very heavily wooded, but for the most part the timber was not what would be called good. The neighbourhood of Lukolela was very thickly timbered, but he could not say that he had seen any timber worth looking forward to for development. At all the stations many poles and trees had to be thrown away in consequence of the wood not being good. Teak and the African oak were found especially at Lukolela and Bolobo.

Sir ERASMUS OMMANNEY further asked what was the velocity of the stream, and at what elevation above the sea the highest point of the river was which was reached by the *Peace*.

Mr. COMBER said that in some parts the current-meter showed a velocity of

only two or three knots an hour; in other places the velocity was five or six miles an hour. At Stanley Pool the river was estimated by Stanley to be 1147 feet above the sea. In passing cataracts he had not thought it worth while to take observations. Between Vivi and the coast the fall would be about 100 feet, and between Stanley Pool and Liboko probably 400 feet.

The CHAIRMAN said the paper to which they had listened was not only written in a popular style, but was of great geographical value, as supplementing the labours of Mr. Stanley and members of his staff. Ten years ago nothing was known of that region; it was not even known where the Congo came from, and Livingstone himself, although he had the honour of discovering its sources and travelling on its upper branches, died in the belief that they were the sources and upper branches of the Nile. It was not until Stanley went down the river that geographers could connect those branches about Bangweolo, Moero, and Cazembe with the Lower Congo. For Stanley's voyage they were indebted to the liberality of the proprietors of the *Daily Telegraph* and the *New York Herald* who furnished the means for conducting the expedition; but mainly they were indebted to the energy, courage, perseverance, and endurance of Stanley himself. He had hoped that Mr. Stanley might have been present on this occasion; if the meeting had been held a week earlier he had informed them that he would have been able to attend, but he was out of town at the present time. On his return to London, however, he might be able to be present at a meeting of the Society either in that hall or some other. After Mr. Stanley's acknowledgments were due to the King of the Belgians, whose courage, disinterested liberality, and unremitting perseverance and energy, fairly launched the African International Association. Encountering great difficulties at the beginning, he had now achieved a great success. He had in fact, founded a Free State, a thing that had never before occurred in the history of the world. One of the results of this had been the establishment of the Baptist Mission and the Livingstone Inland Mission, which were really creating a perfect revolution for good in the interior of Africa. As geographers, as philanthropists, as Christians, the members of the Society had hitherto followed with interest the progress of the African Association, and now that it had emerged from its difficulties and had a bright future before it, they heartily congratulated the King of the Belgians on his success, and felt an honest pride in the fact that Englishmen had taken so large a share in the enterprise. In conclusion he proposed a vote of thanks to Mr. Comber and Mr. Guinness.

Some Remarks upon Nakala (Fernão Veloso Bay) and other ports on the Northern Mozambique Coast.

By HENRY E. O'NEILL, F.R.G.S., H.M. Consul, Mozambique.

Map, p. 416.

In the beginning of 1883, I had occasion to visit the coast which lies between Mozambique and Fernão Veloso bays, and I availed myself of this opportunity to make a rough survey of Nakala, the southern arm of the latter bay.

This splendid port has not, as far as I can discover, been yet brought to light, although it is without doubt one of, if not the finest, port of the East African Coast. In the British Admiralty charts it is utterly unmarked, and I have only seen an attempt to portray it in a Portu-

guesse map once shown me at Ibo. In this, however, it was represented as lying due east and west, its true direction being N. $\frac{1}{2}$ E. and S. $\frac{1}{2}$ W., and no attempt was made to define its extent and capacity. It was also wrongly said to be the mouth of a river which had its source some distance in the interior.

Except at its southern extremity, which ends in a huge tidal Khor overrun with mangrove bush, Nakala presents, along almost its whole length, coast lines of considerable beauty. The picturesque promontories of Mjuani, Mayaya, and Namusu, and their intervening bays, are entirely free from any swamps or unhealthy surroundings; the ground rises along the eastern shore to a height of 100 and 200 feet, and the view from these headlands is open and very beautiful. Numerous good anchorages upon the eastern shore, with elevated and apparently healthy sites for European residence, seem to mark out this side as well adapted for colonisation.

The whole of the country extending from the eastern shore of Nakala to the sea, and of the Mosembe district generally, is rich in valuable woods that have hitherto only found a sale on this coast. On one occasion a number of samples of them was sent to Europe, some of which were submitted to the examination of the Timber Inspector of the English Royal Navy, Mr. Haslett, who reported in 1859 that "they were well worthy of a further trial in our dockyards."

The western shore is far more irregular, and the land is low, but better watered, and perhaps better adapted for the growth of produce that thrives best in a humid alluvial soil, such as sugar, rice, and tobacco. But this shore is at present depopulated and desolate. It was not so eight or ten years ago. Then the inner shores of both Nakala and the outer bay were inhabited by a section of the Makua tribe under a chief called Mtuba-mnu, and the district occupied by them was regularly resorted to by traders from Mazizima in Fernão Veloso Bay. But since that date this tribe has been subject to periodical attacks from the warlike Makua chief Namaralo, and by him they have been driven across the river Nihegehe towards the sea. Great numbers were killed and others carried off into slavery, and the remnant of the tribe now dwell upon the peninsula of Mwamba-koma, which forms the northern shore of Fernão Veloso Bay. This promontory of the coast, though ill-watered and comparatively speaking of poor unproductive soil, is now thickly populated, whilst the rich and fertile districts that line the shore west of Fernão Veloso Bay and Nakala, are completely deserted, owing to the fear yet inspired amongst the coast people by a lawless Makua chief.

As my statement, claiming to have brought to light, four centuries after a European occupation of this coast and within a day's sail of the capital of this province, one of the finest harbours of the East African coast may cause some surprise and comment, I feel I may be justified in

bringing before the notice of the Council of the Royal Geographical Society certain passages in a recent report (1884) of Captain Augusto Castilho, a distinguished Portuguese Naval Officer, now Governor-General of Mozambique. Captain Castilho speaks of Nakala in the following enthusiastic terms:—(1) "One of the finest harbours of the coast. . . ." (2) "In which hundreds of the largest ships might ride out with security the most violent tempests." (3) "I was really astounded (*ficando realmente maravilhado*) by the excellent and magnificent conditions that this splendid port offered for the founding of a large colony (*uma grande colonisação*)." Again, in another part of the same report (p. 73), Captain Castilho repeats "Nakala is one of the best harbours of the globe."

Captain Castilho's assertion that he visited Nakala in 1870, does not, I submit, in any degree lessen the accuracy of my statement that I was the first to "bring it to light," for his expressions of astonishment and surprise prove that it was only at his late visit he himself discovered its beauties, and he adds "it seems incredible that no one in any position of authority has noticed even the fact of the existence of that bay so near to the capital of the province." Good harbours are indeed to be found in plenty between the mouth of the Zambesi and Cape Delgado, but no effort is made to utilise their advantages for the development of the country. If nature had left upon the South African coast one such port as Nakala, Pomba, Conduçia, Mokambo, and half-a-dozen others I could name, with which this short length of coast is gifted, it would long since have become the emporium of South African trade and the site of a splendid commercial city. Nothing strikes the coast voyager with greater amazement than the indifference of the Portuguese to the treasures of this description that lie at their hands, and more especially does this come home to an Englishman, when, in going south, he sees the labour, money, and energy that is being expended by his countrymen in endeavours to obtain one secure and capacious port.

It may be interesting to seek the reason of this unequal distribution, or, in other words, this difference of formation between the coast north of the Zambesi delta and that south of the Portuguese possessions. It appears to me to be in great part, if not entirely, due to the strong lateral pressure exerted upon the shore by the current that sweeps with such velocity to the southward between these points. I say to the southward; but as this current is caused by the division, at Cape Delgado, of the great equatorial current, the centre of which strikes the East African continent at this point in its westerly course, its pressure will be in lines which vary gradually from west to south.

The lines of greatest pressure will be therefore in the vicinity of this cape, and it is here that the greatest irregularity of coast-line is to be marked, viz. in the Querimba islands and the deep bays and inlets which they cover. Continuing southward we have abundant evidence of the

working of this pressure in the splendid bay of Pomba (Mwambi), Almeida Bay, Simuku, Momba (Mwendazi) with its deep inlet of Marazani, Fernão Veloso Bay with its noble arms, Nihegehe and Nakala, Kisima-julu, and again in the deep bays of Conduçia, Mozambique and Mokambo.

Although there are no islands between the southern Querimba and the first of the outlying shoals south of Mokambo Bay, yet the configuration of the coast-line between these two points leads naturally to the supposition that a number are in course of formation. The most marked evidence of this lies in the peninsulas of Mwamba-koma and Mosembe, both in process of being cut off from the continent by the action of the sea along the lines that now form the bays of Conduçia, Fernão Veloso with its deep branches, and Momba with its inlet of Marazani.

In assuming that this irregularity of coast-line is mainly due to the lateral pressure exerted upon the coast by a swift current, I have also taken into consideration the well-defined limits of that current, which practically ceases just north of the Zambesi delta, and therefore exactly coincides with the cut-up coast-line extending from Cape Delgado to the southern Primeira Isles. Also the fact that though of great velocity its breadth is small. Any captain of the British India Company will tell you that 50 or 60 miles from the coast you lose it entirely, and before they called at Ibo, it was their usual custom when journeying northwards to strike out from Mozambique to that distance in order to escape it. The compression of this great stream of water within such narrow limits, cannot fail to increase its lateral pressure upon the coast.

I have spoken of the pressure due to the volume of water passing down this coast as a force distinct and outside that of ordinary tidal influence, and I think it should be considered as such, although its effects are similar. The method of action hardly needs description here. Discovering the weak points in the armour of coral that girts this coast, the sea has entered in, and attacking the softer upper strata at the back, has by its ceaseless irresistible action worn away and levelled lands, scooped out bays and inlets, and produced deep anchorages and secure ports, where, in ages past, there existed but dry land.

On the other hand the coral growth is steadily creating fresh islets and new lands to the seaward. This growth will naturally advance with greatest rapidity towards the sea, meeting in the pure salt sea-water the conditions most favourable to its vigorous development. In the channels between the outlying islands, through which the daily ebb and flow rushes in many places like a mill-race, its growth will naturally be retarded, and upon their inner shores it will be stifled under the deposits carried there by the ebbing tides and fresh waters of the rivers of the coast.

In speaking of the current upon this portion of the Mozambique

request of the German traders, and after a palaver with the chiefs, the whole of the territory owing allegiance to the king of Togo was placed under German protection. The treaty was signed at Bagidā on July 5th, and in the course of the month the German flag was hoisted at the principal places of the protectorate.

The coast extending from the British territory westward to Whydah, the only port of Dahome, is divided into four kingdoms, viz. Togo, Little Popo, Ague, and Great Popo. Togo, the German protectorate, has a coast-line of 12 miles, and stretches about 10 miles inland. It includes a "Beach" and a "Mainland," separated from each other by a shallow but navigable lagoon.

The "Beach" is nowhere over a mile in width. For a distance of 50 to 200 paces from the sea it consists of grey or yellow sand, covered in many places with the bleached remains of cuttle-fish. Beyond this lies a strip of dense thorny shrub, having crossed which a red-clay country of more varied aspect is entered upon, where sedge, shrubs, clumps of coco- and oil-palms alternate with broad savannas. Along this interior slope of the "Beach" lie the principal villages, the places on the coast being merely trading ports. Of these latter Lôme or Bē Beach, although only established in 1881, is, next to Little and Great Popo, the most important place along the coast between the British territory and Whydah, doing an annual trade of between forty and fifty thousand pounds. Seven factories are established there, including two German, one English, and three native houses belonging to British subjects. Bē or Bey, the town of which Bē Beach is the port, lies about a mile inland. It has about 3000 inhabitants, and enjoys some fame on account of a fetish temple dedicated to Njikpla, the god of war and shooting stars. The fetish is represented on horseback, and in European dress, yet Europeans are not admitted to the town unless they first strip, and Dr. Zöller and his companions considered themselves favoured for being allowed to keep on their trousers, boots, and hats. The houses of Bē, quite contrary to what is usual in the interior, are circular, with tall conical roofs, and projecting eaves. They are built of red clay mixed with sedge. Coco-palms, bananas, and shrubs peep out above the hedges which enclose each homestead.

Bagidā Beach has five factories, viz. two German, one English (F. & A. Swanzy, represented by a black), and two belonging to Sierra Leone negroes. The road to Bagidā town leads through a wood of exogenous trees, abounding in monkeys and birds. Bagidā is a place of no importance in the present day, having scarcely a couple of hundred of inhabitants, yet its chief, "King Gasu," enjoys a certain authority, and an ox-tail, wrapped up in linen, which he lent Dr. Zöller as a token, was treated with respect by the villagers on the mainland.

Porto Seguro, in the days of the slave-trade a place of considerable importance, but fallen into decay since the king of Togo granted it to one of his boatmen who now styles himself King Mensa, hardly counts 1200 inhabitants. It is described as by far the filthiest place along the coast, with heaps of refuse piled up in the narrow lanes separating its circular or square huts. It is the only place of the territory where cattle are kept. Coloured agents of two French houses and of a Sierra Leone firm are stationed there. Bgun Kope or Gum Koffi, the frontier village, is a place of no importance.*

* The European firms having factories in the "Protectorate" are Messrs. F. A. Swanzy (at Bē Beach and Bagidā), C. Goedelt (at Bē Beach), F. M. Victor and Wölber and Brohm (both at Bē Beach and Bagidā). The French houses of C. Fabre & Co and Regis Ainé & Co. are represented by native agents at Porto Seguro. The native traders, all of Sierra Leone, are G. B. Williams, Tommy Williams, G. B. Cole, Hooper Brothers, and Acansey.

The lagoon which separates the beach from the mainland has an average width of about a mile, but widens out in the centre of the territory into the Avon Lagoon of the Admiralty chart, more appropriately called Hakko Lagoon, after the river which enters at its northern extremity. The lagoon, when Dr. Zöller navigated it, was only ten feet in depth, and the natives punted their boats with bamboo-poles twenty feet in length. After heavy rains it rises as much as sixteen feet, and it then presents the features of a lake, whilst in the dry season it is obstructed by numerous patches of reeds, with winding passages between, along which boats can pass. Fish are plentiful, and fish-fences extend in many places from bank to bank where the natives, standing in the water, take out the fish by basketfuls. The Hakko or Haho river is deep, but sluggish. It varies in width between 65 and 130 feet, and its banks are covered with dense woods, in which oil-palms form a prominent feature. The river is obstructed by numerous fences for catching fish.

The mainland is undulating, rising in elongated swells to a height of 200 or 300 feet. There are no isolated hills. A tenacious grey loam occupies the valleys, which are subject to being flooded, whilst a fertile red clay, containing nodules of ironstone, covers the uplands. In two of the valleys Dr. Zöller observed numerous wells excavated in the grey loam to a depth of 80 feet. The vegetation of these low-lying districts is almost confined to reeds and bamboos, whilst the uplands are covered with coarse grass and shrubs, and gigantic baobabs form conspicuous features in the landscape. Near the villages plantations of coco- and oil-palms, of papaw-trees, ananas, bananas, and oranges are met with. Maize and cassada form with sweet potatoes the principal crops. Pepper, indigo, and cotton are likewise grown.

The country is populous. The numerous villages are remarkable for their cleanliness. The streets are better swept "than at Berlin," and all refuse is thrown into big holes, which are covered over when full. The houses are rectangular. The walls are built of huge bricks made of clay, reeds, and straw; and the roof, which projects over the open end of the house, is thatched with straw. The floor is covered with red clay. Sometimes the interior is divided into two or more apartments, in which case windows with wooden shutters or bars are provided. Occasionally there is even an upper floor, with a practicable staircase leading up to it. Several of these houses usually stand within an enclosure made of maize straw. The household furniture includes straw mats to sleep on, calabashes and various vessels made of earthenware, including huge amphoræ for holding water, partly buried in the ground, and curiously-shaped low stools. Each village has its "court of justice," usually an open court surrounded with a covered arcade; its fetish temple, gaily painted on the outside; and its palaver-place. Fetish huts are frequent along the paths. They for the most part contain priapic figures with carefully sculptured human countenances, near which cowries and other offerings are deposited or suspended on poles. The natives are excellent potters, tan leather, spin yarn, and weave cloth. They are armed with swords and knives, spears and muskets.

The dress of the girls is limited to a slight "slip," but married women usually wear a kilt, and sometimes even a toga, such as is worn by the chiefs. The men wear drawers or a toga, and cover the head with a "night-cap" or a broad-brimmed straw hat. The hair is mostly worn short, but "swells" of either sex devote much time to dressing it in an extravagant style. Ornaments, consisting of rings round the arms or legs, and necklaces, are worn by both sexes. The natives are fond of drink, but rarely take it to excess. They are also great smokers. Their fields are neatly kept, and although ploughs and even hoes are unknown, and the ground is merely loosened with the end of a stick, the crops are heavy. Sheep, pigs, goats, and poultry are kept.

Togo, the capital, consists of a group of five villages lying at the foot of a cliff of red loam, in the midst of coco-palms, bananas, and bushes. Its population is about 2500 to 3000. Gbome, a village on the western side of the lagoon, is inhabited by natives from the interior. Wo, in the north-east, is merely a small village, but on every fifth day its market-place is attended by some 6000 people, and 3000 gallons of palm-oil are frequently sold in a day. European traders never attend these markets in the interior.

GEOGRAPHICAL NOTES.

Mr. James's Expedition into North-Eastern Africa.—The expedition equipped by Messrs. F. L. and W. D. James, which is mentioned in the 'Proceedings,' *ante* p. 120, as completing its preparations in December last for the exploration of Somâli-land, has safely returned to England. The Messrs. James were accompanied by Mr. G. P. V. Aylmer, Mr. E. Lort Phillips, and Mr. J. Godfrey Thrupp, and their caravan consisted of upwards of 60 Somâli, including an armed guard of 20. Their headman was Dualla, who had been one of Stanley's best men on the Congo. The intention was to cross North-eastern Africa from Berbera to Mogadoxo, but invincible obstacles prevented the party from accomplishing the whole of their programme. They succeeded, however, in reaching Barri on the Webbe river, thus making a journey of about 400 miles, the greater part previously untrodden by Europeans, across the central plateau. Barri is 215 miles distant from Mogadoxo.

Grenfell's Journey to the Stanley Falls of the Upper Congo.—The Rev. Geo. Grenfell has returned to Stanley Pool from a voyage of five months in the missionary steamer *Peace* to Stanley Falls. We are indebted to his colleague, the Rev. T. J. Comber, for the following particulars of the journey:—From Stanley Pool to the Falls took thirty-five days. Mr. Grenfell ascended the Mobangi or Ubangi tributary to 4° 30' N. lat., the Alkere to 2° 50' N., the Lubilash or Lomame to 1° 50' N., the Mbura to cataracts 10 miles from its embouchure, the Ikelemba or Ruki as far as it was navigable, viz. only 100 miles. The Sankuru proved to be only an unimportant small stream; the Albangi river is *the* river, but the tribes are bad and fierce; the Ukere is thought to be the Welle. Cannibalism reported. The Lefini and Mangala were also ascended a little way.

Expedition for the Search and Relief of Dr. Junker.—The cost of Dr. Fischer's expedition to the Upper Nile region, viâ Zanzibar and Victoria Nyanza, for the relief of Dr. Junker, which we mentioned in our May No. (p. 338) as in preparation, will be defrayed entirely by Mr. F. Junker, a banker of St. Petersburg and brother of the traveller. He has placed the sum of 2000*l.* at Dr. Fischer's disposal for the object.

Dr. Lenz's Central African Expedition.—In a communication to the last number of the Austrian 'Monatschrift für den Orient,' Dr. Oscar

Lenz gives a few details as to the plan of his proposed expedition to the region which lies between the Upper Nile and the Congo. By the end of June, at the latest, Dr. Lenz will sail from Hamburg, expecting to arrive at Banana Creek, at the mouth of the Congo, in the first half of August. Here the necessary wares will be purchased, and Dr. Lenz expects to reach Stanley Pool in the beginning of October, the rainy season. After a little delay here the explorer will proceed up the Congo, and as soon as a favourable point is reached, he will commence to push his way north or north-east, in order to cross, where practicable, the water-divide between the Congo and the Nile. Gaining the south of the Bahr-el-Ghazal provinces, Dr. Lenz will endeavour to obtain news of the missing Europeans. Any point of departure, as Dr. Lenz states, from the north bank of the Upper Congo will bring him into unvisited territory, and lead to new geographical results. Dr. Lenz's expedition receives the hearty support of the authorities of the Congo Free State, and he may expect every assistance in making his way up the river. His only white companion will be Herr Oscar Baumann, of Vienna, a young geographer and naturalist, who, he expects, will be of great service to the expedition. Dr. Lenz hopes he may yet receive considerable additions to the sum already collected for the expedition, some 2000*l.*, which seems scarcely adequate to the carrying out of so extensive an enterprise.

An American Missionary's Journey in East Africa, West of Inhambane.—Mr. E. H. Richards, of the American East Central African Mission, made a journey in October last from Inhambane to the Limpopo river, crossing a region which is at present a blank on our maps. He took with him his Zulu helper named "Cetewayo," eight porters, and a horse, the object being to discover as much as possible of a reported Zulu-speaking people, who were subject to Umzila and whose principal town was Baleni, on the Limpopo. The party left Inhambane on the 8th of October and the next day crossed the Bombom river, which forms the western boundary of the Portuguese province. This river drains the eastern slope of the Makwakwa ridge, and a large area of western Inhambane. It flows south and is not more than two yards wide, flowing in a channel as deep as it is wide. The Ama-kwakwa tribe was encountered on the third day. They are an idle people, subsisting on the wild fruit which is abundant, and frequently getting intoxicated on palm-wine, which they procure from a palm-tree, usually four or five feet high, which is plentiful all over the country. They have no gardens. Being so frequently robbed by Umzila's soldiers, they have become quite discouraged. Many kraals were deserted, and a tract of country 75 miles wide by a greater distance in length lying west of the Makwakwa ridge was nearly desolate. It was in this semi-deserted region that the tsetse fly was first seen. The route lay to the W.N.W. along the northern border of Makwakwa-land. On the fourth day the travellers came to a lake of fresh water about five miles in

length by a little less in width. This was the first and largest they passed. Five miles beyond this the country was one vast level from the Makwakwa ridge to the Limpopo river. A long and narrow marsh was met with on the fifth day, which was doubtless a river in the rainy season, but now thick with reeds. The water was fresh at the point where it was first seen, but on their return, about 30 miles to the southward, a similar (reedy) river was crossed, which was salt on one side, but fresh in the middle and farther on. This is probably the Umtahefu of Baines. The water was not three feet deep, and on their return the crossing was quite passable. Many antelopes were seen, though not in herds as on the Sabi river, also spoor of elephant and hippopotamus. On the 16th the travellers, after a march of 22 miles, arrived at a kraal of the Ama-gwaza, Umzila's own people, which contained 60 huts and about 300 people. The name of this place, as also of the chief, was Ama-gunzana, by whom the travellers were treated cordially upon his learning that they were not Portuguese. The Limpopo is the only recipient of the overflow of the many lakes of this region. No mountains were seen or heard of by the travellers in this vicinity, as indicated by St. Vincent Erskine in his recently issued map. The party struck the river at a point 22 miles in a westerly direction from Inhambane. Baleni was 75 to 90 miles distant to the south, and Umzila's chief town a month's journey to the northward. The return journey was made through a thinly wooded country, where the trees were profusely robed in wreaths and festoons of a grey tree-moss, and beautiful birds were abundant. In three days the watershed between the sea and the Limpopo was reached, inhabited by a kind-hearted and industrious people, possessing cattle and sheep and large gardens. This ridge was ascertained by pedometer to be 57 miles from the sea, and 78 miles from the Limpopo.—A few general observations concerning the three separate tribes or nations met with on the journey may be of interest. The Ama-tonga inhabit the province of Inhambane. The Bombom river, which is about 30 miles from the sea, is their western border. Their language is unique and different from the Ama-gwaza. They call themselves the Tonga of the Portuguese, and the Gwaza the Tonga of Umzila. It would appear that the Tonga and Gwaza tongues were originally one, but 400 years of Portuguese rule and intercourse with Arab traders, have so modified the one, and the Zulu invasion and possession so modified the other that at present they seem to be two similar but distinct dialects. The Tongas live in populous villages; their kraals are large, and their gardens well cultivated. The Makwakwa or Ama-kwakwa people inhabit from the Bombom river to the western side of the Makwakwa elephant bush, a distance of 90 miles in a direct line. Physically and in language they resemble the Zulu more than the Tonga, but not so much so as the Gwaza. The Ama-gwaza or people of Umzila inhabit or control the region from the

Zambesi on the north to the Limpopo on the south, and with the exception of the Portuguese possessions of Chiluan and Inhambane, from the sea on the east, to the Matabele country on the west. Baleni is on the west bank of the Limpopo, and was for some time the home of Umzila.

Kafraria.—The May number of 'Petermann's Mittheilungen' contains the first part of what promises to be an exhaustive monograph on Kafraria and the east border lands of Cape Colony, with a map (scale 1:1,500,000). The present part deals with the physical structure and landscape features.

Colonel Prjevalsky.—M. Prjevalsky has been utilising the past autumn and winter months in making excursions to the westward from the China-Tibetan frontier as far as Lob-nor. He has evidently made some important additions to our knowledge of this region. The middle range of the Kuen-lun has been carefully examined, and three new peaks, each over 20,000 feet, discovered. The Tibetan plateau skirting the middle Kuen-lun has an average height of 4000 feet. The region is sparsely peopled; at the time of writing (February 10th), Colonel Prjevalsky had not seen a human being, except those of his own party, for three months. Very rich natural history collections have been obtained. During the present summer Colonel Prjevalsky intends, if possible, to traverse Northern Tibet, returning to Turkistan in the autumn.

Mr. Forbes's Expedition.—Mr. H. O. Forbes left London in April for New Guinea via Batavia. We are glad to notice that he is likely to get a considerable addition to his limited funds. The Melbourne and Sydney branches of the Geographical Society of Australasia have offered to subsidise the expedition to the extent of 500*l.* on certain conditions, with which, no doubt, Mr. Forbes will find little difficulty in complying. The same societies have decided to send an independent expedition from the Aird river, to be commanded by Captain Everell.

The Malay Peninsula.—We have received from Mr. William Cameron a copy of his MS. map of a portion of the Malay Peninsula, including the country between 2° 30' N. and 4° 25' N., and long. 101° E. and 103° 35' E., and thus showing parts of the States of Selangor, Pahang, Perak, Negri Sēmbilan, and Sungei Ujong. The explorations made by Mr. Cameron in Pahang, Selangor and Sungei Klang extended over a period of three years, and with the data thus gathered, the compilation of the map occupied six months. Upper Pahang was almost entirely unknown until it was explored by Mr. Cameron. Messrs. O'Brien and Daly, who crossed from Moar and went down the Bērā in 1875, contributed valuable information as to that river and the lower reaches of the Pahang. Baron Maklay also went up the main Pahang river as far as the Tumbiliang, proceeding by way of the latter to the Kēlantān, but beyond these places little was known; and no European had ever

penetrated the territory to the north and the west until it was visited by the author of the map in 1882. The coast-line of this map is taken from the Admiralty charts, but Mr. Cameron, finding that the longitude of Kuala Lumpor, furnished by the Government of Selângor, did not correspond with that given on the Admiralty chart, has laid down another coast-line deduced from the longitude of that place, which he distinguishes by colouring it green. An important feature in this map is the manner in which it exhibits the distribution of minerals, which are indicated by combinations and arrangement of colours; there are also many important additions to our knowledge of the geography of this country, especially as regards the courses of the rivers; those which are only known by native reports being shown by straight lines, indicating their general direction. The names of nearly all places and rivers are given both in English and Native character. Explanatory notes and a table of latitudes and longitudes of salient points as laid down in the Admiralty charts, and the maps of the Asiatic Society, are given in parallel columns, so that their differences can be seen at a glance, and on account of the discrepancies in the longitudes no meridians have been drawn on the map, so that when an adjustment has been arrived at they may be drawn in their proper places, and the work of alteration thus simplified. The value of such a map as that which Mr. Cameron has presented to the Society will be fully appreciated by those who are aware how little the geography of this country is known. The map is $5\frac{1}{2}$ by $7\frac{1}{2}$ feet and is drawn on the scale of one inch to two statute miles.

Earthquakes in Japan.—The work which has been done by the Seismological society of Japan, under the initiative and guidance of Professor John Milne, has been of the highest value to physical geography. The last volume of the 'Transactions' of this Society contains a paper by Professor Milne, which is of especial value as being at once an earthquake history of Northern Japan for two years, and a summary of the whole work of the Society. The number of earthquakes observed in two years ending October 1883 was 387, or an average of four per week. The area of observation was that portion of the main island of Japan lying between 35° and 40° N. lat. Some of the shocks were observed in only a single town, or were sufficiently great to be observed over the whole region. The main questions concerning any single earthquake are its direction, intensity, and extent. Of these, the most difficult to answer is the extent, and Professor Milne, with the support of the Japanese Government, adopted an ingenious and effective method of obtaining the required data. Bundles of post-cards were directed to the local police, post, and telegraph officials, in all important towns within 100 miles of Tokio, with a request that every week one of the cards should be posted, with a note of any earthquake that might have occurred. It was soon discovered by this method that almost every disturbance came from the north to Tokio, and passed that city to the south and west, until it reached a lofty range of mountains bounding the great plain of Tokio on the south, and here it stopped. The post-card barrier was then extended farther and farther north, until it included the whole of Northern Japan. One curious fact, which is now fully established, is the powerful effect of mountain ranges in limiting the extent of disturbance. In addition to these observations as to extent, the intensity and direction were measured by various delicate instruments,

which were under the control of trained observers. The general result from 387 earthquakes observed in this way show that an ordinary earthquake, although having a general direction of propagation, has at a given point many directions of vibration; and that both the amplitude and period of its motion vary at different places. Again, 84 per cent. of the earthquakes originated beneath the ocean, while in the vicinity of active or extremely recent volcanoes the seismic activity has been small; in other words, there is no direct relation between volcanic and seismic centres. The side of Japan in which earthquakes are most frequent is that which slopes steeply to a deep ocean, and where there is abundant evidence of a recent and rapid elevation. The "law" of greater frequency of earthquakes in winter is supported by Professor Milne's researches; of the total number in two years, 278 occurred in winter as against 109 during the remaining months of the year. Moreover, he finds that the winter earthquakes are also more intense than those which occur in summer; while the number is about $2\frac{1}{2}$ times that of summer, the intensity is $3\frac{1}{2}$ times. No marked coincidence of the occurrence of shocks with the phases of the moon has been observed, though a small increase was found at the times of low water. As to the matters of propagation and vibration, the precise origin and termination of a shock, the exact duration and velocity, Professor Milne's data do not permit him as yet to speak definitely.

Prehistoric Structures in Micronesia.—Captain L. U. Herendeen, of San Francisco, communicates to the American journal, *Science*, the following notes on prehistoric structures in Micronesia. American missionaries recently settled at Ponapé may, it is hoped, furnish additional details hereafter. "A few years ago I visited Ponapé Island in the Pacific, in $158^{\circ} 22'$ E. long. and $6^{\circ} 50'$ N. lat. The island is surrounded by a reef, with a broad ship channel between it and the island. At places in the reef there were natural breaks, that serve as entrances to the harbours. In these ship channels there were a number of islands, many of which were surrounded by a wall of stone five or six feet high; and on these islands there stood a great many low houses, built of the same kind of stone as the walls about them. These structures seem to have been used as temples and forts. The singular feature of these islands is that the walls are a foot or more below the water. When they were built they were evidently above the water, and connected with the mainland; but they have gradually sunk until the sea has risen a foot or more around them. The natives on the island do not know when these works were built; it is so far back in the past, that they have even no tradition of the structures. Yet the works show signs of great skill, and certainly prove that whoever built them knew thoroughly how to transport and lift heavy blocks of stone. Up in the mountains of the island there is a quarry of the same kind of stone that was used in building the wall about the islands; and in that quarry to-day there are great blocks of stone that have been hewn out, ready for transportation. The natives have no tradition touching the quarry—who hewed the stone, when it was done, or why the work ceased. They are in greater ignorance of the great phenomena that are going on about them than the white man who touches on their island for a few hours for water. There is no doubt in my mind that the island was once inhabited by an intelligent race of people, who built the temples and forts of heavy masonry on the high bluffs of the shore of the island, and that, as the land gradually subsided, these bluffs became islands. They stand to-day with a solid wall of stone around them, partly submerged in water."

Danish Explorations in Greenland.—In addition to the particulars recently published on the subject, we have received the following intelligence.
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gence of the expedition under Lieutenant Holm, which is now spending its second year on the east coast of Greenland, conveying news from the same up to the beginning of last winter. Having found the depot of provisions made during the previous year at Huidlek, $61\frac{1}{2}^{\circ}$ N. lat., in good state and untouched, the expedition proceeded in July last year northwards in the company of a number of East Greenlanders, who had been to the west coast trading, and were on the way to their homes, in $65\frac{1}{2}^{\circ}$ N. lat. The party was a very large one for these parts, being for a time no less than 119 people, viz. 4 Europeans (Lieutenants Holm and Garde, and Drs. Knutzen and Eberlin), 3 half-breeds, acting as interpreters, 30 West Greenlanders, and 82 from the east coast, the number of boats being 9 "woman" boats and 27 *kajaks*. At the end of July the great glacier Tuisortok, extending down to the sea, was reached, which in 1829-30 was so troublesome to Lieutenant Graah, the only European who had previously visited it. It was, however, now passed without much difficulty. Half of the West Greenlanders were here sent back, while the rest continued the journey northwards, reaching the settlement Tingmiarmiut ($62^{\circ} 40'$ N. lat.) in August, after having encountered a great deal of fog. Here the expedition separated, according to the original plan, Lieutenant Holm and Dr. Knutzen proceeding in the company of the East Greenlanders, northwards, whilst Lieutenant Garde and Dr. Eberlin went southwards to Nannortalik, where they were to go into winter quarters. It was Lieutenant Holm's intention, the weather being then very fine, to attempt to reach Angmaksalik, in 65° N. lat., where there is a fixed settlement, but which has never been visited by Europeans, and where he would winter. It is in the vicinity of the spot, King Oscar's Harbour, visited by the last Nordenskiöld expedition (1883) without however, seeing any natives. In the spring of the present year, it is the intention to explore and chart this part. Lieut. Holm further states that the heathen East Greenlanders were very obliging and friendly, and that they were all of great service to the expedition. They are very remarkable people, being as tall as the North Europeans, and mostly having dark eyes and hair. They have nothing whatever in common with the Eskimo. They are stated, however, to die early and very suddenly. That they should be descendants of the Norsemen seems hardly likely, in view of their heathenish belief, total want of civilisation, and utter absence of Norse language and tradition. News from Lieut. Garde, up to October last, says that during his journey southwards to Nannortalik he explored eight of the great fiords between lat. $62\frac{1}{2}^{\circ}$ and $60\frac{1}{2}^{\circ}$ N. right to the bottom without finding the slightest ruins or trace of any European colonisation. The mineralogical, geological, and botanical harvest was very rich. At Nannortalik the meteorological and physical observations commenced in 1883 were continued, the station having been furnished with a new set of instruments for magnetic and auroral observations. Further news of the expedition,

at all events the party under Lieut. Holm, and of their doings during the present year, cannot be expected before the return next autumn.

Irregularity of the Tides.—At the sitting of the Paris Academy of Sciences on March 16th, Admiral de Jonquières brought together some interesting observations on the irregularity of the tides in different localities. Thus while on the coasts of continents washed by the great oceans, two tides a day are the rule, in other places, for example at Papeete in Tahiti, there is only one tide in the twenty-four hours, which occurs regularly between 1 and 2 P.M. In the Gulf of Tongking and the Chinese Coast to the north, and in the Philippine Islands, the same anomaly is observed, but more complicated. According to the phases of the moon, there are, first, two tides daily, of nearly equal amplitudes; then one of them increases in amplitude and duration, and ultimately there is only one tide in the twenty-four hours. Next, the tide decreases in amplitude with the phases of the moon; a new tide appears which increases, gradually encroaches on its predecessor, and finally overwhelms it, as it were. At its culmination it lasts the whole day, after which it diminishes to give way ultimately to another, and so on with a perfectly regular periodicity. The Admiral then referred to the well-known anomalies in the heights of tides at different places, such as those of the Channel, the Bay of Fundy, Corea, and other coasts favourably situated. In the open ocean, again, as in the Society Islands, where the progress of the “tidal wave” meets with no opposition, it is scarcely perceptible.—These facts are already pretty well known to those who have made a special study of tidal phenomena; indeed, nowhere are the tidal intervals so regular as on the coasts of England and France, where the phenomena were first studied, and which have furnished a standard for subsequent investigations. The subject has been very fully discussed by Sir Frederick Evans in his British Association Addresses at Glasgow and York.*

Geographical Bibliography.—At the German “Geographentag” held in Hamburg in April last, a committee, consisting of Professor Van Richthofen, Professor Theobald Fischer, and Dr. Supan, editor of ‘*Petermann’s Mitteilungen*,’ was appointed to consider the subject of the preparation of a geographical bibliography.

The Manchester Geographical Society.—The first three parts, in one, of the Journal of this young society comprise sixty-eight pages. The principal paper is the lecture delivered by Mr. Stanley at Manchester on the Congo. There is also the inaugural address of the President, Mr. J. F. Hutton, with a few notes, book-notices, and a note on the origin of the society.

Fund for the Benefit of the Widow of the late Librarian, Mr. E. C. Rye.—The following letter from Mr. Cuthbert E. Peek gives the result of the

* Proc. R.G.S., vol. xxi. p. 66; and vol. iii. N. S., p. 633.

subscription, in the management of which he has taken a leading part, for the widow of our late Librarian:—"May 23rd, 1885. Sir,—I have much pleasure in informing you that the sum of 709*l.* 19*s.* has been contributed by the Council and Fellows of the R.G.S., and other friends, as a fund for the benefit of the widow and children of our late Librarian, Mr. E. C. Rye. With this amount 700*l.* Victoria Four per cent. stock has been purchased, and invested in the joint names of Mr. C. R. Markham, C.B., F.R.S., Mr. S. W. Silver, and my own. The balance, together with any further donations, will be similarly invested, and the interest handed over to Mrs. E. C. Rye. Mrs. Rye desires me to convey her heartfelt thanks to all who have so generously contributed to the fund. Believe me, yours faithfully, C. E. PEEK. To the Secretary R.G.S."

Obituary.

Major-General Christopher Palmer Rigby.—The death of General Rigby, in his sixty-fifth year, on the 14th of April, at his residence, 14, Portland Place, after a few days' illness, will be deeply felt by a wide circle of private friends and officers in the Navy, Army, and Diplomatic Services, but particularly will his loss be felt by those who were associated with him for fourteen years in the Council of this Society. He was a man of clear, sound judgment, who never feared to express his opinion, either in conversation or in his lucid correspondence; and the Society will find it difficult to replace one who has been so thoroughly useful in all subjects connected with Eastern Africa.

His family lived at Yately Lodge, Hants, where he was born on the 20th of January, 1820. His education commenced at a school in Westmoreland, where he remained for three years; thence he was removed, at eleven years of age, to the Grammar School, Abingdon, Berks, and finally entered the Military College, Addiscombe, and passed out before attaining the prescribed age of sixteen for the East India Company's service.

Arriving in Bombay during July 1836, he was soon posted to the 16th Native Infantry, and commenced to study native languages as he knew this was the certain road to Staff employment. He passed, at twenty years of age, in Hindostani and Maharatta, and was appointed Quartermaster, Interpreter, and Paymaster in 1840, to a wing of his regiment at Aden, where our troops were hard pressed by the Arabs, and remained for four years till obliged to leave on medical certificate. While in the Aden garrison he compiled an outline of the Somali language and vocabularies of the Sathpoora languages—both of which, and accounts of Toorun Mal and the Bheels, were published by Government.

It should be mentioned that wherever Rigby travelled, whether in Europe, Asia, or Africa, he always studied languages with an instructor. He was an Oriental linguist whom few could excel, having passed in Hindostani, Maharatta, Canarese, Guzerati, Persian, and Arabic. His sick leave and furloughs to Europe were spent in acquiring European languages at the capitals, making excursions on foot over the Alps and Pyrenees; and on one occasion he was the guest of the Emperor of Russia during a review held in the end of June 1853, when 110,000 infantry, 25,000 cavalry, and 220 guns were assembled. Being such an expert in languages he rose rapidly in his profession, and we find him successively appointed Interpreter to his

Regiment; Superintendent of the Revenue Survey in the Deccan; Second in Command of the Bheel Corps; President of Examination Committee at Bombay; Persian Interpreter to General Stalker during the war of 1857 when we took Bushire and made Persia give up Herat and leave Afghan territory; lastly, he was nominated Her Britannic Majesty's Consul at Zanzibar and Muscat from the 27th of July, 1858, and retained it till the 5th of September, 1861, when his health had completely broken down and he proceeded to Europe.

During the time Colonel Rigby was Her Majesty's Consul at Zanzibar, he rendered energetic service to geographical explorers sent out by this and other countries; he received Captains Burton and Speke on their return, 4th of March, 1859, from discovering the Lakes Tanganyika and Victoria Nyanza. Dr. Roscher's murderers were tried and found guilty by Colonel Rigby, two were executed and two allowed to return to their village. The Baron von der Decken delivered letters of introduction in 1860 from Lord John Russell, Colonel Sykes, Mr. W. Oswald, and was cordially assisted by Colonel Rigby.

In the same year, on the 17th of August, the expedition of Captains Speke and Grant, which was sent out by this Society, was received and lived at the British Consulate. All the native members of this exploring party were sworn in, advances made, contracts completed, under Colonel Rigby's personal superintendence, and, by his influence with the Sultan, the governor of the town, and the principal natives, the expedition soon started with comfort for the unknown interior.

But of all the acts of Colonel Rigby's life, none show his firmness of character better than his having suppressed an insurrection raised at Zanzibar by the two brothers of the young Sultan. These princes, Seyyids Burghash and Thowanee, combined together and collected an armed force of fanatical Arabs from Oman and the Persian Gulf with the intention of capturing Zanzibar. The Sultan was panic-stricken, the shops were closed, the town was full of insolent armed natives committing murders, the Consul was often fired at while in his boat. But at the instance of Colonel Rigby, H.M. ships *Assaye*, *Lynx*, and the corvette *Olive* appeared off the town. The wild Arabs were dispersed after some sharp fighting, Seyyid Burghash, who is the present Sultan of Zanzibar, was surrounded in his house, and surrendered his sword to Colonel Rigby, thence conveyed in H.M. ship *Assaye* as a State prisoner to Bombay, where he was under supervision for eighteen months. Thus did England, through her representative, support the rights of the Sultan and his father, our old ally the late Imaum of Muscat, and Colonel Rigby received the thanks of the English and Bombay Governments.

Yet one other hazardous duty was performed by our consul. Immediately after the above events, in February 1860, he set about putting a stop to slavery. He found that the British India subjects, 5000 to 6000, residing in the island of Zanzibar and in the towns of the mainland, had many slaves in their possession, and that this traffic on sea and by land had not been interfered with for eight years prior to his arrival in Zanzibar. He therefore determined to stop this traffic by summary measures, as the mainland was becoming depopulated. Twenty-five thousand slaves were being carried away annually to Persia and northern ports, and many others to Reunion for the French, and to Cuba for the Spaniards. He chained some of the wealthier Indian subjects, imprisoned them in the fort, and fined them for disobeying his orders; and by making a few such examples he established British authority and emancipated eight thousand slaves up to the time of his leaving Zanzibar in 1861. The Sultan thought his country would be ruined by this interfering policy, and showed his displeasure by not paying Colonel Rigby the customary farewell visit; but, at a later date, he made full amends, and sent the Colonel a handsome gold-mounted sabre in acknowledgment of his services.

In January 1864, he was appointed Commissioner for the settlement of boundary disputes between the Guicowar of Baroda and the Nawab of Nawánagar. In November of the same year he was sent to the residence of His Highness the Jam of Nawánagar, and crossed the gulf to Mandavia, the chief seaport of Cutch, and was engaged for a considerable time in investigating the rival claims of the Jam and the Rao of Cutch to the sovereignty of the Chaka Islands and the valuable pearl fishery at Nawánagar. About this period he rescued from slavery five African boys and girls who had been brought from Muscat by an Arab for sale. He reported to Government the systematic traffic in slaves which was carried on with impunity in Kutch and Káthiáwár. In carrying out these varied duties during his successful career, he always displayed a remarkable fearlessness of danger and responsibility, showing that he possessed those characteristics which have been so pronounced in the men who have built up our Indian Empire.

One incident may be mentioned to show the friendly relationship existing to the end between the natives and General Rigby; a letter written in excellent English has been received from a slave who was liberated by him in 1860, full of affection for his old master, who had breathed his last before the letter reached England.

He married Miss Prater on the 27th of June, 1867, and leaves two sons and a daughter, having retired from the service in 1866.

Mr. A. Adams-Reilly.*—Mr. A. Adams-Reilly, who died at Dublin on the 15th of April last, was one of the most energetic and accomplished of the band of mountaineers who twenty-five years ago filled up a conspicuous gap in European geography by exploring and mapping the High Alps. Born in Ireland in 1836, but educated at Rugby and Oxford, he was early fascinated by Forbes's 'Travels through the Alps of Savoy.' Having been thus induced to take up mountain exploration, he joined, in 1862, the Alpine Club, and in the following year made Professor Forbes's personal acquaintance—an acquaintance which soon ripened into close friendship, and furnished the impulse for the important cartographic work by which Adams-Reilly will be remembered. It was nothing less than the production of the first complete map with any pretensions to accuracy of the loftiest glacier group of the Alps—his 'Map of Mont Blanc,' 1865. This was followed by a second map representing the whole Italian side of the Pennine chain from the Great St. Bernard to the Monte Moro—in other words, the portion of the Monte Rosa group not included in the Swiss Federal Survey. These maps, covering a field of enormous difficulty, where the previous material was scanty or next door to worthless, must be reckoned among the most remarkable productions in mountain delineation achieved by the unaided work of any amateur. Adams-Reilly did for a large portion of the Pennine chain what Payer and Von Sonklar have done for the glaciers of Tyrol, and Franz Schrader is doing for the Spanish Pyrenees; what the Alpine Clubs of the future will have to do for Adai Choch and Koschtantau, for Nanda Devi and Kanchinjanga,—he took up the work of mountain surveying where governments, intent only on political objects, had caused their surveyors to leave it off.

An account of the circumstances connected with the construction of Adams-Reilly's map of Mont Blanc will be found in Mr. Whymper's 'Ascent of the Matterhorn' and in the 'Alpine Journal' (vol. i. p. 257). But since no notice was ever taken of his work during his lifetime in the publications of our Society, it seems to me proper to repeat some of these circumstances, not only as an act of justice to our late Fellow, but also as an example of what may be done by one man to supply the failings in orographic details of a Government survey, when that man is a competent mountaineer and artist as well as surveyor.

* By Mr. D. W. Freshfield.

In 1863, when Mr. Reilly began his survey, only two small and disconnected fragments of the chain of Mont Blanc were delineated on maps with any pretence to accuracy, the corner included in the Swiss Federal Atlas and the basin of the Mer de Glace which had been surveyed by Professor Forbes. For the rest there was no authority but the wretched old Piedmontese Survey, a mere caricature above the snow-level, in which "errors of no less than 1000 feet had been committed in the determination of heights, glaciers were represented of double their real dimensions, and ridges and mountains were laid down which actually had no existence."

In this state of things Mr. Adams-Reilly set out with his theodolite, and, starting from a base-line measured by Forbes, determined by triangulation the positions of more than 200 points. The accuracy of his work is shown by the fact that after having turned many corners, and carried his observations over a distance of 50 miles, his Col Ferret "fell within 200 yards of the position assigned to it by General Dufour." The spaces between the trigonometrically determined points he filled in from a series of careful panoramic drawings, on which the bearings of every peak were carefully noted.

"This departure" (the large use of sketches) "from the system generally employed, I found," writes Mr. Adams-Reilly, "of inestimable value, and had it been more generally pursued nearly all the mistakes with which mountain maps abound would have been avoided." Doubtless; but then there are few map-makers who can dash off such brilliant sketches as those in the portfolios I have just turned over, sketches in which the lines are few, and yet every characteristic feature in the structure of the peak, every fold in its snowy drapery stands out as in nature herself.

The result of all this work, spread over two seasons, was a map of Mont Blanc, on a scale of 1:80,000, which—reproduced in chromolithography—gave a perfectly clear and accurate view of the structure of the chain and the relations of the ice-fields, and left little but minor detail for after-workers to add.

That this was speedily added was also principally due to Adams-Reilly. While engaged on his map, he met Captain Mieulet of the French Staff—France had then lately annexed Haute Savoie—who had been sent to commence a new survey. The ideas of the Etat-Major as to mountain map-making were—as their results in Dauphiné and elsewhere have sufficiently proved—behind those of the Alpine Club. Captain Mieulet had been assigned an area of 100 square miles to map, with a ludicrously inadequate allowance for the necessary aid in guides and porters. Adams-Reilly's enthusiasm, however, was contagious; he imbued with it first Captain Mieulet, then his superior, Colonel Borson, and through the latter officer the Department at Paris. It could hardly be borne that an Englishman's map of so conspicuous and newly acquired a French possession as "Le Mont Blanc" should surpass that of the Etat-Major, and such would obviously be the case, unless "something was done." The French Government did the right thing handsomely, and ordered a special survey of Mont Blanc to be taken on the scale of 1:40,000, double that employed elsewhere, and following the natural limits of the chain in place of political boundaries.

Some idea of the amount of hard work undertaken by Mr. Adams-Reilly in the correction of his maps, may be formed from the fact that he climbed Mont Blanc itself seven times, besides making innumerable expeditions among its aiguilles. A picture of one of his camps above the snow-level will be found on p. 185 of Mr. E. Whymper's 'Ascent of the Matterhorn,' and opposite it a characteristic series of miniature portraits of Adams-Reilly himself.

In completing the material for his Map of the Valpelline and Monte Rosa (1:100,000) he was forced to wander for days in out-of-the-way fastnesses of the Val d'Aosta, where there was no accommodation and little food, and his health

suffered from the privations then undergone. An accident to his knee—not met with in mountaineering—cut short his wanderings, but not until after the completion of this second map. For nearly twenty years, until the recent publication of a new Italian survey, all map-makers were, so far as the southern side of the Monte Rosa range is concerned, completely dependent on this amateur production.

The two maps were published at the expense of the Alpine Club. In 1874 Mr. Adams-Reilly was offered the Presidency of that body, and his refusal, dictated by a characteristic, though very needless diffidence, was a cause of much regret to its members. By his personal friends Mr. Adams-Reilly was held in singular esteem and affection. His work, as one of them has well said, was their service; no claim of friendship was too slight for him to hasten to meet it; and his bright, loyal, and affectionate nature endeared him to all who knew him. We may apply to him the words he himself wrote of Forbes (whose biography he prepared for the ‘*Encyclopædia Britannica*,’ and to whose ‘*Life and Letters*’ he contributed three chapters)—“The scientific value of his life will not soon be forgotten, and by those who enjoyed the privilege of his friendship his memory will always be affectionately cherished.”

REPORT OF THE EVENING MEETINGS, SESSION 1884-5.

Eleventh Meeting, 27th April, 1885.—The Right Hon. Lord ABERDARE, President, in the Chair.

ELECTIONS.—*George Allan, Esq.; Ernest Jno. Blake, Esq.; The Hon. C. P. Brown; Rev. W. H. Hewlett Cooper; William French, Esq.; George David Harris, Esq.; William Hughes-Hughes, Esq.; Henry Hutton, Esq.; George O. Mutton, Esq.*

The following papers were read:—

1. Letter announcing the Ascent of Mount Roraima, British Guiana. By Everard im Thurn.

2. “Notes on the Journey to Roraima and Ascent of the Mountain.” By H. J. Perkins.

Publication is deferred until the arrival of the report on the journey and ascent by Mr. im Thurn.

Twelfth Meeting, 11th May, 1885.—The Right Hon. Lord ABERDARE, President, in the Chair.

ELECTIONS.—*O. Henry Ames, Esq.; Henry Robert Baines, Esq.; Richard William Crowther, Esq.; Alfred John Weyman, Esq.*

The paper of the evening was the following:—

“East Africa between the Zambesi and Rovuma Rivers.” By H. E. O’Neill, Esq. Will be published, with map, in a subsequent number of the ‘*Proceedings*.’

PROCEEDINGS OF FOREIGN SOCIETIES.

Geographical Society of Paris.—February 6th, 1885: M. ALPH. MILNE-EDWARDS, of the Institute, in the Chair.—The Chairman in opening the meeting alluded to the loss which the Society had just sustained by the death of M. Dupuy de Lome, engineer, a member of the Academy of Sciences.—Among the presentations made to the Society two curious photographs of Annamite panels carved in wood may be specially mentioned. They were obtained from a Buddhist pagoda near Saigon, and represent the reception of the first European travellers at the court of Annam (about the year 1610). The figures carved by the artist are probably those of the Portuguese or Dutch. These panels, which possess great geographical interest, were discovered some years ago by M. Ch. Lemire, the author of several well-known works relating to Indo-China and New Caledonia. M. Lemire is one of those French officials who, during their residence in the extreme East have perhaps contributed more to geographical science than any other class of men. He himself, it may be remembered, was one of the first to call the attention of the French Government to the New Hebrides, the annexation of which has, upon his initiative, been claimed by the different geographical congresses. His works on penal colonisation have attracted great attention.—The Minister of Foreign Affairs communicated a despatch dated 18th December last, received from M. Ledoulx, French Consul at Zanzibar. The Consul speaks therein of the fifth Belgian expedition of the International African Association, which had just arrived at Zanzibar under the command of Lieut. Becker. For the transport of provisions and baggage the expedition would, according to the Consul, require a caravan of about 1000 porters, which would entail an expenditure estimated at 10,000*l.* (250,000 francs). Apart from the expense the recruiting of such a large number was a difficult matter under the present circumstances, even supposing that the Sultan gave his consent. It was the intention of the expedition to take some horses (five) with them, with the view of acclimatising them in the interior. M. Ledoulx had strong doubts as to the success of this experiment, the tsetse fly and the bad conditions of food and water supply having hitherto been against the introduction of horses into these regions. The famine also now raging in the interior would present a serious obstacle to the progress of the expedition. This famine was causing hundreds of the unfortunate natives to come and sell themselves, in order to escape almost certain death, to the Arab traders, who tried to send them across to Zanzibar and elsewhere. An adult negro was worth two rupees or nearly 4½ francs, while a female fetched double. M. Ledoulx stated that M. Victor Giraud arrived at Zanzibar in excellent health on the 18th of December. In conclusion the Consul announced the arrival at Zanzibar of the envoys (four in number) of the German Society of Colonisation. It was reported that their mission was to acquire lands in Usagara. M. Ledoulx was of opinion, however, that they had come to relieve the members of the Moero Station, who had been in the interior for nearly four years.—The French Resident at Nam-Dinh, M. Gouin, naval lieutenant and author of a very excellent map of Tongking, forwarded some information on the navigation and commercial resources of the southern mouths of the delta of the Red River. In his note he lays particular stress on the advantage offered by the opening of the Cua-day, which can be navigated by the large junks of the Chinese waters and gives immediate access into those provinces of the delta which are most fertile in rice. By this means also the obstruction and deadlock which, owing to the extraordinary amount of traffic, is imminent in the Cua-Cam at Hai-phong, would be remedied, the latter place being the only port at present commanding

commercial communications between the delta and the outside world. The correspondent also recommends the erection of a lighthouse on the Norway Islands, the point from which all ships, whether coming from the south or from China, make the land. A letter was received from Captain Martellière, French Assistant Resident at Ninh-Binh, requesting to be made a member of the Society and stating that he would send the account of a journey which he had just accomplished in the country of the Muongs to the west of his station. The appearance and habits of these mountaineers differed essentially from those of the Annamites. M. Martellière was stated to be also occupied with the question of the importation into the delta of the magnificent hard woods coming from Thanh-hoa, of which there existed nearly one hundred specimens.—M. Germond de Lavigne, who is a member of the syndicate for securing the interests of literary and artistic ownership, brought forward a question lately raised by M. G. Depping, viz. that of the insufficiency of the guarantees given to authors and publishers of original geographical maps. As the case now stands it would seem that these can be copied by the first comer, and there is no possibility in the majority of cases of proving piracy. M. Germond de Lavigne stated that the geographical map was protected by the French law, in the same way as books, engravings, music, &c. M. Maunoir, who took part in the discussion on the previous occasion, argued as before, that although the work itself was protected in theory by the law, it was the piracy or infringement of copyright which was so difficult to prove.—M. E. de Rogozinski sent from Mondoleh on December 25th a report on the ascent he had made by a new route of Mongo-ma-Lobah, the great peak of the Cameroons. This was the third ascent of this mountain, which was 14,000 feet high. The first attempt was made in 1860 by Burton, and the second by Comber in 1878. At the top of the mountain the declivities were so abrupt that it was to be feared that the summit would soon fall into the crater itself, above which it now rose.—M. René Allain presented on behalf of the Geographical Society of Tokio (Japan) a work written in English on the Japanese Expedition to the Island of Formosa, the author of which was M. Edward House. M. Allain made some comments on this work and also upon the article published in the last number of the 'Proceedings' of the Royal Geographical Society of London (some extracts of which had been translated and read at the last meeting of the Society). The writer of this article, M. Beazeley, quoted a passage from the work of Dr. Wells Williams on the Empire of China, to the effect that "the Chinese have only known the Island of Formosa since the year 1403." Relying on the testimony of MM. Hervey de St. Denis, Rosny, and the learned geographer Ma-touan-lin, M. Allain said that the Chinese visited Formosa for the first time in the year A.D. 605, and made an expedition to the island in the year following under the 12th Chinese Dynasty of the Soui.—In conclusion a communication was made by M. Léon Rousset on the central district of the peninsula of the Balkans and on the junction of Turkish railways with the International European system. He pointed out what remains to be done in order to connect the Servian railways with the line of railway running past Philippopolis and Adrianople in order to reach Constantinople, and also the physical obstacles to be surmounted before this union can be effected. M. Rousset's paper went to show the great difficulties which Austria would encounter in establishing a direct line of communication between her Bosnian possessions and Constantinople; this fact explained the interest she took in the question of the union of the Servian railways with those of Turkey. The following conclusion might also be drawn, viz. that when Austria seriously desired to annex Salonica, the first step she should take in this direction would be the conquest of Servia.

— February 20th, 1885: M. ALPH. MILNE-EDWARDS, of the Institute, in the Chair.—A letter was read from the Imperial Geographical Society of Russia.

announcing the death of M. N. Severtzov, who was drowned in the Ikoretz, an affluent of the river Don, during the night of the 9th of February.—M. Michel Venukoff, who was present at the meeting, presented a map of modern China, which had just been published in Russia. It was prepared, he said, from native materials, and all necessary information regarding the map and its authors, one of whom was M. Nikitine, would be found in the '*Revue Géographique*' of M. Drapeyron, vol. iii. 1885. M. Venukoff then added a few words regarding the manner in which M. Severtzov met his death. The ice of the river, which he was crossing, was not sufficiently thick, and giving way under him, he disappeared under the water. He was dragged out alive, but unfortunately, before reaching the neighbouring village whither he was being carried, he died from the severe cold.—The Chairman then announced the early return to France of M. Victor Giraud, lieutenant of the French Navy, who he said had been for two years exploring at his own expense the country of the great lakes of Equatorial Africa.—M. Germond de Lavigne, who is a member of a syndicate formed for the protection of literary and artistic ownership in France, again brought forward the question (introduced by him at the last meeting of the Society but only by letter) of the guarantees given for the protection of the authors and publishers of geographical maps. It will be remembered that several members of the Society, and among others MM. Ant. d'Abbadie and G. Depping had complained that geographical maps were not sufficiently protected against reproduction. M. Maunoir and also M. Bouquet de la Grye had further shown how difficult it was to prove that there had been even imitation. M. G. de Lavigne maintained, on the contrary, that the rights of authors of maps were perfectly secured by French legislation and also by international conventions. He then proceeded to enumerate those agreements, some of which specially mentioned the geographical map, while others simply stipulated in favour of "works of engraving, lithography, &c." The agreement with England related to "drawings, lithographical engravings, and all other productions of literature and the fine arts." The General Secretary, M. Maunoir, intends to reply at one of the early meetings of the Society, and will bring forward some convincing facts to meet the arguments of M. G. de Lavigne.—MM. Gustave le Bon and Edmond Cotteau forwarded news of their respective travels. The former writing from Khatmandu (Nepaul) on the 9th of January, stated that after several days' march across the steep summits of the Himalaya he had just arrived at the mysterious capital of Nepaul, which Elisée Reclus called "the great unknown country of Hindustan." M. le Bon believes he is the first Frenchman who has succeeded in visiting Khatmandu, access to the country having been up to the present time closed against Europeans. This country, he adds, is one of the most curious in India, and the richest in monuments. The inhabitants, to judge of them by their features, must have a large proportion of Chinese blood in their veins. The traveller congratulates himself on the reception he met with in the various Native States of India, where he went for the purpose of studying the principal monuments of the country.—The Secretary then read a letter from M. Kraetzer, French Consul-General at Calcutta, stating that he was engaged in collecting all the available information regarding plantations of mahogany trees, which had been cultivated in the province of Madras with apparently complete success. The Consul was desirous of making the cultivation of these trees a source of profit to Tongking, where the climate was eminently suitable for their growth. At the same time the Consul took the opportunity of recommending to the Government and planters the acclimatisation of the tea plant in Tunis and also in the south of Corsica; he was persuaded that the attempt would be attended with great success. He advised that use should be made of plants already acclimatised, which would be found now under cultivation by a noble Sicilian who had himself introduced them to the district between Catana and

Messina. In the same letter M. Kraetzer advised tourists and travellers desiring to see India to choose any season rather than winter to make their visit, for in winter he said "India is not India," just in the same way as no one could imagine he had seen Russia who had only visited it in the month of July.—A communication dated December 26th, was received from the French Resident at Nam-Dinh (Tonking) M. Gouin, naval lieutenant, who addressed a letter to the last meeting of the Society, in which he dwelt on the necessity of opening up a new commercial way by means of the Cua-day, one of the mouths of the Red River (Tongking Delta). In the present communication he stated that the desire expressed by him was on the point of being realised, if it was not already an accomplished fact. The scheme was one of special importance to the innumerable coasting junks carrying cargoes of rice, as it was all-important that they should be able to penetrate into the delta by a commercial waterway close to the centres where this commodity was produced. The correspondent was of opinion that there would be no delay in establishing at the mouth of the Day, probably at Phat-Ziem, a port, the importance of which might become very considerable.—M. F. Schrader presented a sketch map (not published) of the Lake Nahuel-Huapi, which had been described several times in recent years, but the descriptions had not been accompanied by maps. It occurred to M. Schrader that a drawing on the scale 1 : 500,000 would possibly be of interest. The sketch was made in conjunction with M. Fr.-P. Moreno at the time of the visit of the latter to Paris some years ago. M. Schrader rectified an error which for some time had been reproduced, he said, in several geographical works, viz. with reference to the longitude of Ta-tcheu, determined by the Pundit A—K, and also by Prjevalsky and Kreitner. A—K seemed only to have arrived at this longitude in a vague manner; he fixed it at $49^{\circ} 2'$ east of Greenwich. The observations of Prjevalsky and Kreitner appeared to have been made with more precision. Unfortunately their maps, however, could not be thoroughly relied upon, there being a great difference between the two determinations. Kreitner placed the point in question 32 minutes more to the east than Prjevalsky did, i. e. at $49^{\circ} 57'$ instead of $49^{\circ} 25'$ as indicated on the map of the Russian traveller. But in the work of the latter entitled 'Du Zaisan au Thibet,' it was twice stated, and particularly on page 87, that the town of Ta-tcheu ought to be placed "from 40 to 50 versts further east than represented on the map," or in round numbers about 30 miles, which under the latitude of Ta-tchen would correspond to about 33 minutes; thus the determination of Prjevalsky became almost identical with that of Kreitner.—M. Alph. Pinart then read an account of his journey to the Chiriqui, Central America (see Quarterly Bulletin).—In conclusion a very interesting communication was made by M. A. Potel, civil engineer, on the basin of the La Plata, and on the Eastern Republic of Uruguay. He spoke of the general commerce of these countries with Europe, and pointed out that the trade of Uruguay and the Argentine Republic, which comprise nearly 3,000,000 inhabitants, amounted to more than 36,000,000*l.* sterling per annum; of this figure the commerce with France was 7,000,000*l.* French commerce, however, had not increased to the same extent as that of other nations, for according to the official statistics of the last four years that of England showed an increase of 80 per cent. and that of Germany of 400 per cent. French manufacturers and workmen employed agents to sell their goods, who charged a commission of 15 to 20 per cent. In this way the price of their manufactured articles was considerably increased, and their sale rendered almost impossible in competition with those sold direct from the makers. There were now about 100,000 Frenchmen living in La Plata, and they possessed there in lands and commercial houses more than 200 million francs. The speaker advised French merchants to lessen their expenses by combining to send representatives to the spot. He concluded by suggesting the establishment of a French

bank at Montevideo, where, he said, foreign banks were being carried on with success, and among others the "London and River Plate Bank," which last year paid a dividend of 11 per cent. to its shareholders.

— March 6, 1885: M. ALPH. MILNE-EDWARDS, of the Institute, in the Chair.—The Chairman opened the meeting by congratulating M. Giraud upon his safe return after a journey of three years' exploration in the East of Africa. A deputation of the Society with M. de Lesseps at its head had gone to receive him on his arrival. M. Milne-Edwards concluded by announcing that the Minister of Naval Affairs had just decorated M. Giraud with the Cross of the Legion of Honour.—Among the works presented to the Society attention should be called to a facsimile of the most ancient known map of Switzerland. This map was executed by Türost, a Zurich physician, who lived at the end of the 15th century and was the author of a little geographical work entitled '*De Situ Confederationum*' (1496-7), where this map was found. In conjunction with Dr. Wartmann (of St. Gall) Professor Georges Wyss (of Zurich) had published a new edition of Türost's work accompanied by the map in question in '*Quellen zur Schweizergeschichte*,' vol. vi. (Basle, 1884).—The news given by the daily papers concerning an insurrection of several tribes in Morocco, gave an opportunity to M. H. Duveyrier to rectify an error made by the Press in stating the names of these tribes, and also to show how serious this revolt was in consequence of the *Berâbers* being included among the disaffected tribes. The *Berâbers* were, he said, divided into *Aït Yafelmâns* in the north and *Aït Attas* in the south, the former being mountaineers like the Kabyles and the latter nomads, but not less warlike than the Kabyles themselves. According to the statements of Viscount de Foucauld, who had traversed Morocco in 1884, they could put from 20,000 to 30,000 armed men into the field. M. Duveyrier considered the situation to be very threatening to the dynasty of the Sultans-chérifs.—From Ciudad-Bolivar (Venezuela) M. Chaffaujon wrote on the 22nd January that he had arrived in that town after having spent some time in the study of the Lower Orinoco. These investigations, though superficial, had sufficed to reveal the numerous errors existing on maps of that region. He affirmed that very few of the points were quite accurate. Among others, the maps of that branch of the Orinoco navigated by the vessels of the Orinoco Company were full of mistakes: none of them indicated with much accuracy the course of the river; the pilots trusted to their experience and practical knowledge of the river. In a few days from the time of writing M. Chaffaujon intended to start for the Upper Orinoco, his project being to ascend the river by easy stages so that nothing should escape him from a descriptive point of view; finally he intended to make an exhaustive study of the fauna, flora, and especially the geology of the district. He hoped to return to Bolivar at the end of May.—The name of Dr. Crevaux, the unfortunate victim of the Tobas, was mentioned at the meeting in connection with a project for the exploration of the Gran Chaco, which two young Frenchmen, MM. J. De Brettes and P. Lacabanne-Courrière, submitted to the Society in a letter written on the 31st of January from Parana. They remarked that it had been found possible to ascend the Pilcomayo and the Vermejo, the two great rivers which watered the northern part of the Gran Chaco, but no one had up to the present succeeded in visiting the districts of the interior. It was in these regions that the remains of the numerous tribes who formerly inhabited the provinces of Santiago, Estero, and Salta had taken refuge. This last stronghold of their independence the Indians defended with desperation, regarding as a declared enemy every foreigner who attempted in the interest either of science or commerce the exploration of their virgin forests and unexplored deserts. The two correspondents had prepared a list of the various attempts which had been made from the time of the discovery of the Gran Chaco in the 16th century by Alexis Garcia, who was assassinated on the borders of

Paraguay, up to the expedition of Crevaux. Since the unfortunate termination of that mission M. A. Thouar had visited the banks and districts of the upper Vermejo. At the present moment General Victorica was endeavouring to explore the countries in the neighbourhood of the same river. These achievements were complete as regards that portion of the country, and, therefore, the two travellers would direct their investigations from the side of Southern Chaco. According to them, it was the excessive nature of the precautions taken by former travellers that had contributed most to their failure. Therefore, they intended to take only two Indian servants with them. With this feeble escort they were going to cross Chaco at its widest part from Corrientes in a straight line to Candelaria (province of Salta). The ethnology of the centre of South America was very little known, and they would give themselves to a special study of the curious manners and customs of these Indian tribes who represented a great past. They would not, however, neglect botany and mineralogy. As they advanced from time to time in their journey they would send news by Indian messengers. They had started from Buenos Ayres on January 3rd.—Prince Roland Bonaparte forwarded a manuscript work on the recent discoveries of the Dutch in New Guinea, and especially on the journey of the Resident of Ternate, M. van Braam Morris, on the river Amberno.—M. Fr. Schrader made a communication on the laws which regulate storms of snow (fine powdery snow) in the mountains whither the winds carry them. The observations of M. Schrader had special reference to the Pyrenees, which he had studied in particular. These masses of snow, he said, were not carried hither and thither by chance, but obeyed certain laws, which were very simple. According to these laws, the snow was deposited at points where the wind diminished in force. Therefore it followed that travellers, when compelled to struggle against a snow-storm, would do well not to try and take shelter whither their instinct guided them, but, on the contrary, make for those spots where the wind blew with the greatest violence, for it chased away the snow; they should regard with distrust the most calm places.—In conclusion, M. Ch. Rabot gave an account of his recent journey in North Finland and Russian Lapland. Continuing the exploration made some years ago by MM. Pouchet and de Guerne, he had visited specially the valleys of the Pasvig and the Talom, as well as Lake Enara. It would appear that all this country is an immense forest, dotted with lakes and tracts of peat-moss, intersected by rushing streams of water. The river Pasvig, which drains Lake Enara, forms no less than thirty cascades and rapids. This Lake Enara is truly an inland sea, studded with hundreds of little islands covered with magnificent pine woods. All the country round the lake is a little hilly, and forms a depression between the plateau of Finmark and the range of hills which cover Russian Lapland. M. Rabot pointed out particularly the importance of this depression from a political point of view, for it gave Finland easy means of communication with the coast of the glacial ocean. The day, he said, would undoubtedly arrive, and that very shortly, when the line of railway, which now terminated at Uleaborg, would be carried to that ocean. Russia would then be in a position to utilise the excellent ports which she possessed on that coast—ports which were never blocked up by ice, and which up to the present time could not possibly have been utilised, in consequence of a want of easy means of communication with the interior of the empire.

— March 20th, 1885: M. ALPH. MILNE-EDWARDS, of the Institute, in the Chair.—The Chairman announced at the commencement of the meeting that the Commission of Prizes had awarded the gold medal of the Society to M. Victor Giraud for his travels in the centre of Africa.—The Minister of Foreign Affairs forwarded a copy of a report from M. Ch. Ledoux, French Consul at Zanzibar, dated January 17th. The first part of the report was occupied with

a statement of the proceedings which the Consul had been compelled to take against the deserters from M. Giraud's caravan. Among other news the Consul announced the death of King Mtesa, and according to native messengers from Ukerewe (south of Nyanza) the brothers and sons of the deceased were disputing the vacant throne, he also announced the death of the famous King Mirambo—information which had been confirmed by the Sultan of Zanzibar. The result of Mirambo's death would be to throw into a state of anarchy all the vast regions which this potentate had subjected to his authority. The Consul then commented on the failure of the German mission sent by the Berlin Society of Colonisation, which had started for Usagara. Of the four men composing the mission one was dead, two others (Dr. Peters and M. Baumann) had been attacked with fevers, and had returned to Zanzibar in a very dangerous state of health; the other member of the party, viz. the chief of the expedition, had remained on the spot without any provisions. One of the German merchants at Zanzibar had started in great haste with food and assistance for the unfortunate traveller. Captain Bloyet, the French Resident at Kondoa had rendered them all the assistance in his power. The Consul announced the arrival at Zanzibar of two German explorers, MM. Cl. and Gust. Denhardt, who had been sent out by the Geographical Society of Berlin. They intended to proceed to Mombasa and thence to Kismayo with the view of reaching Lake Samburo and exploring the country of the Borani-Gallas; it was their intention, however, before visiting the latter, to make a prolonged stay in the neighbourhood of mountains Kenia and Kilimandjaro, where they would explore the snowy regions and study the geology and botany of the district. Lastly, the report of the Consul stated that the Algerian Fathers of lake Tanganyika had just founded a station on the western side of the lake about $7^{\circ} 30'$, near a village named Tchusa and about 30 miles to the south of the Belgian station of Mpala. The fifth Belgian expedition, under Commander Becker, had not yet commenced to recruit its porters. The Consul was of opinion that this would prove a difficult matter in consequence of the famine which continued to desolate the interior.—One of the Ministers of the State of Persia, His Excellency Mohammed Assan Khan Sanieduleh, a member of the Society, and author of a Geographical Dictionary of Persia, based on the work of Barbier de Meynard, forwarded a communication on the subject of Talegun, a canton of the district of Kazvin, situated among the Elburz mountains in the immediate vicinity of the famous peak of Alamont, which formerly crowned the residence of the Grand Masters of the Order of the Assassins. In the month of August last the Shah of Persia, when returning from his usual summer visit to the mountains, passed through the district of Talegun on the way to his summer palace. Among the members of the king's suite was the author of the Geographical Dictionary referred to above, and this circumstance led to the writing of the paper on Talegun, which includes 78 villages. A series of monographs of this character would be of great advantage in increasing our knowledge of Persia.—The Minister of Foreign Affairs forwarded a report from M. Mancini, French Consul at Asuncion, on the results of the expedition despatched by the Argentine Government under the direction of Commander Feilberg, to explore the Pilcomayo and report upon its facility for navigation. The result of the labours of the expedition is that the Pilcomayo is not navigable, and that it is impossible to utilise the river as a means of communication between Paraguay and Bolivia. The explorers ascended the river for a distance of about 240 miles, but were stopped from proceeding further by the strong rapids, where the depth of the stream over a bed of rocks does not exceed 6 inches. M. Feilberg maintains that the vast quantity of water found in the Pilcomayo comes from an affluent unnoticed on existing maps which pours its waters into the Pilcomayo at a point about 180 miles from its mouth. It is affirmed that the waters of

this tributary, which comes from the west-north-west, are of much greater volume than those of the Pilcomayo itself. M. Feilberg ascended it for a distance of 30 miles, but was unable to proceed further in consequence of a large number of tree-trunks which obstructed the course of the river; apart from this obstruction, navigation should be much more easy on this affluent than on the main river. The only means of communication between Bolivia and Paraguay would seem to be by land, and the possibility of this was demonstrated in October 1883 by the Bolivian expedition, of which M. A. Thouar had the scientific direction.—It having been announced from the theatre of war that the Chinese army of Langson had retreated on Long-tcheu (Luong-Chang according to Annamite pronunciation), M. du Caillaud took the opportunity of stating that this Chinese province was formerly a dependency of the kingdom of Annam. It was described as Annamite territory during the time of the Trân in the thirteenth century, being probably included among the territorial cessions made to China by the usurper Hô-Quy-Ly in 1404. M. du Caillaud then drew attention to the importance of the Pescadores or Pong-hu Islands in the Straits of Formosa, an archipelago which he said might be considered as the Malta of the Chinese Sea. This group possesses several deep roadsteads capable of being defended with ease, viz. the Bay of Nin-Kung, the harbours of Ponghu and Makung, and two other small roads. The most beautiful of these harbours is that of Makung, which is sheltered on every side, and varies in depth from 25 to 50 feet, with a length of $2\frac{1}{2}$ miles, and an average breadth of nearly 1 mile. The Pescadores are the key of the large island of Formosa, and form a kind of maritime oasis in the waters of the Formosa Channel. They are an excellent point of observation. In clear weather the smoke rising from the dwellings in Formosa can be seen from these islands. The population of Formosa has reached nearly $3\frac{1}{2}$ millions, but even among the Chinese portion of the inhabitants revolts are of frequent occurrence. When an insurrection fails, the rebel leaders take refuge among the mountains, where it is difficult to pursue them, and there they keep up a guerilla warfare. More executions take place in Formosa than in any other part of the Chinese Empire, and nowhere do they produce less practical results. One of the first insurrections took place in the year 1721, when all the Imperial mandarins except one were killed by the rebels, and the capital fell into the hands of the latter. The last important rising was in 1863; a Chinese named Te Ban Sien proclaimed himself King of Formosa, and in an incredibly short time he was master of nearly all the island.—In conclusion a paper was read by M. Louis Simonin on the condition of the Indians of the United States in 1884 and the new policy of the American Government with regard to them.

— April 10th, 1885: M. ALPH. MILNE-EDWARDS, of the Institute, in the Chair.—The Chairman opened the meeting with the announcement that a member of the Society, M. Edmond Raquet, who died at the end of last year, had bequeathed to the Society the sum of 400*l.* (10,000 francs). This legacy he said was the third which had been left to the Society within a comparatively short time. The two others were those of MM. Poirier and Fournier, the former being to the amount of 5600*l.* (140,000 francs), and the latter of 2000*l.* (50,000 francs). In these two instances, however, the amounts had to be applied to the foundation of two prizes, while in the present case the legacy was left to the Society without any reservation, and could be utilised in promoting the interests of the Society in any direction.—M. Michel Venukof communicated some information on the journey of a Russian surveyor, M. Guedéonof, in the Transcaspian country, which he had visited with the object of determining the geographical position of certain points. The traveller commenced his journey at Kizil-Arvat and returned to Southern Turcomania by way of Merv and Askhabad. The length of the route traversed exceeded 745 miles

(1200 kilometres) and the number of points determined was 48. M. Venukof also supplied information on the topographical works executed in the Merv oasis, which he said had just been completed. A map consisting of 14 sheets of the country had been prepared on the scale 1 : 42,000, according to which the total superficial area of the Merv oasis was about 2500 square miles (6679 kilometres).—M. A. Thouar communicated the *résumé* of the observations made by him during his journey in Northern Chaco (May to November 1883) in search of the remains of the Crevaux mission. Among other interesting information there are notes on the flora and fauna of the country, on the languages of the Tobas, Matacos and Chiriguano Indians, also on the utensils and implements of the natives, &c. There is a full description of the itinerary from Tarija to Asuncion, together with a table showing the different temperatures recorded. M. Thouar announced his departure at an early date for South America. Incidentally he treated as fiction the report which had been recently spread to the effect that traces of a survivor of the Crevaux mission would be found in the forests of Bolivia.—Several communications were made with reference to African Exploration. In the first place a telegram was read from M. Teisserenc de Bort announcing (6th April) the departure from Tuggurth (Algeria) of the mission under his direction, which had started for Bir-es-Cof by a new route. Dr. Hamy, Director of the Ethnological Museum, then gave some information with regard to M. Dabbene's journey into the interior of Africa. The traveller had penetrated to Lado on the Nile, and had explored the countries of Niambara, Kudurma, Gosa, Makraka, &c. Prince Roland Bonaparte then gave some details, in addition to those already communicated by him at a previous meeting, with regard to the journey of MM. Veth and Van der Hellen in Western Africa. The two travellers had been in Portuguese territory since the end of last year, having arrived from the mouth of the Congo at Mossamedes on December 7th, 1884, where they had already commenced collecting natural history specimens. Their testimony, however, was that in this direction the country could not be compared in richness with the Malayan region and tropical America. The first consignment of their collections, which had arrived in February, was already deposited in the Museum of Leyden. M. Veth also visited the colony of Boers at Humpata. These Boers had quitted the Transvaal at the time when the country was under the presidency of Burgers, with the object of colonising another part of Africa. However, while crossing the Kalahari Desert, they lost their way; a large number of them perished from starvation, others retraced their steps and regained the country they had just left, while only a small party found a route to Cunene, where the Portuguese authorities allowed them to settle. M. Veth had taken some small Java horses with him, and they had rendered good service, having got accustomed to the climate. He was of opinion that these animals would in the future be of great use to travellers in equatorial regions. After the rainy season he intended to undertake a more important journey to the south and east in order to make a survey of Cunene and Okavango. The plateau of Humpata is, according to the traveller, magnificently situated; of considerable elevation, it has a gradual descent to the south, and the climate is reported to be perfectly healthy.—M. Germain Bapst made a communication on the Caucasus and Armenia, which he had recently visited; but a more important paper was read by M. Dennis de Rivoyre on the Bay of Adulis and on French interests in the Red Sea. He recalled the fact that this bay together with the island of Desse had been ceded to France about the year 1859 by the King of Tigre, then engaged in a struggle against the usurper Theodore. The Bay of Adulis was formerly the centre of a considerable commerce. The ruins of the town of the same name might still be seen near a small village

named Zulla, the only inhabited portion of this region. This village was situated at the entrance of the valley of the Addar, the most usual route into Abyssinia. It was undoubtedly this consideration which had determined its site as in former days that of Adulis had been chosen, while in our own time the English had been influenced by the same consideration in choosing Adulis as a stores depôt at the time of their expedition against Theodore. M. de Rivoyre remarked that Adulis had much in common with Massowah, "which," said he, "had never been but a factitious bargain for Abyssinia." He then made some observations upon the Bogos, a people profoundly devoted to France, with whom it was in the interests of France to maintain unbroken relations of friendship, especially in the light of recent events in the Soudan, which M. de Rivoyre considered as an explosion long preparing to burst, and as the awaking of Arab thought rather than the awaking of Islam, since the rising was partly directed against the self-styled Caliph at Constantinople.

Geographical Society of Stockholm.—December 19th, 1884: Consul ELFWING, President, in the Chair.—At this meeting the President and Council were elected for the ensuing year. Professor Hugo GYLDÉN, Astronomer Royal of Sweden, was chosen President.

—February 20th, 1885: the President, Professor HUGO GYLDÉN, in the Chair.—Baron Nordenskiöld gave an account of the culture and habits of the original Eskimo. Having described the present extension of the race, the speaker mentioned that in the year 985, when Erik the Red discovered Greenland, he found no Eskimo there, or "Skrællinger" as they were called by the Norwegians. From a report of a later date it appeared, however, that they existed in the land previous to its being taken possession of by the Norwegians. During the voyages of the latter to "Vinland"—i. e. the coasts of Canada and the United States—they came often in contact with a people who were doubtless Eskimo. This contact led to hostilities between the parties, but the speaker did not believe that the vague report we possessed of an Eskimo attack, in 1379, on the Norwegian colonies in Greenland, could be accepted as a proof of the total annihilation of the latter. Since the breaking off of the connection between Europe and Greenland, towards the end of the fourteenth century, we had no information about the Eskimo until Corte Real brought fifty-seven of them to Lisbon. Further knowledge of them was, however, derived from the expeditions attempting to find the North-west Passage, and the interest of the Danes was aroused to the re-discovery of their forgotten Greenland colonies. A book about the Eskimo published in 1647 by La Peyrère, a Frenchman, from information derived from some natives he had met in Copenhagen, was still in existence, but it was a very exaggerated and misleading work. From the year 1721, when Hans Egede succeeded in realising his plan of christianising Greenland, the Danish sway over this continent might be said to date, and it was to Denmark that we were indebted for most of our knowledge of the race, which might now be said to be fairly accurate. The speaker then proceeded to describe the appearance of the pure Eskimo. They were of average height, inclined to stoutness, had small and brown eyes, a small nose, and black, bristly hair. The pure Eskimo were now rare in Greenland. The half-caste Eskimo were not bad looking. Having described their dress, food, cooking, weapon, utensils, &c., the speaker referred to their boats and their splendid seamanship in handling the same in bad weather, an accomplishment which Europeans hardly ever succeeded in attaining. Their religion, before they became Christians, appeared to be a conglomeration of various superstitious beliefs, among which the "Angekok" or sorcerer played an important part. Their chief characteristics were honesty and good nature, which had made crime almost unknown in Greenland, while there were many examples of

their gay and humorous disposition. He further stated that, although their language was probably a very old one, which he believed was proved by the absence of distinct dialects—as was, for instance, not the case with the Indians—there was no similarity between it and any of the principal groups of languages of the world, and as the culture of the Eskimo, judging by the finish of their weapon and utensils, was very high, and proved a gradual development through ages, whilst they had no contact with other races—he (the speaker) thought that the Eskimo might probably be the true “autochthones” of the Polar regions, i. e. that they had inhabited the same previous to the Glacial age, at a period when a climate prevailed here equal to that of northern Italy at present, as proved by the fossils found at Spitzbergen and Greenland. As it might be assumed that man had existed even during the Tertiary period, there was a great deal in favour of the assumption that he had lived in those parts which were most favourable to his existence. The question was one of the highest importance, as, if it could be proved that the Eskimo descended from a race which inhabited the Polar regions in the very earliest times, we should be obliged to assume that there was a northern (Polar) as well as an Asiatic cradle of the human race, which would open up new fields of research both to the philologist and the ethnologist, and probably remnants of the culture and language of the original race might be traced in the present Polar inhabitants of both Europe and Asia.

NEW GEOGRAPHICAL PUBLICATIONS.

(By J. SCOTT KELTIE, *Librarian* R.G.S.)*

EUROPE.

Keilhack, [Dr.] Konrad.—Reisebilder aus Island. Mit einer Karte. Gera, Reisewitz; London, Dulau: 1885, sm. 8vo., pp. vi. and 230, map. Price 3s. 6d.

— **Island.** Land und Leute, Geschichte, Literatur und Sprache. Von Dr. Ph. Schweitzer. Leipzig, Friedrich; London, Dulau: pp. viii. and 203. No date. Price 5s.

Dr. Keilhack went from Germany to Iceland, by Leith, in 1883. He did not go much out of the beaten track, though his observations will be found of some geographical interest. After Reykiavik, the Geyser, Hekla, the southern glacier district, and other frequently visited places in the south, he sailed from Bordeyri, round the north and east of the island, touching at several places, and finally sailing for home from Eðkifjörð on the east coast.

The second volume is a very full and useful account of Iceland in the various aspects referred to, compiled from well-known authorities, with assistance and contributions by several Swedish friends of the author.

Schellurtz, D. [Hauptmann a.]—Die Landesaufnahme in Russland, 1883. Zeitschrift der Gesellschaft für Erdkunde zu Berlin, 19ter Band, 6tes Heft. Berlin, 1884.

A somewhat full *résumé* of survey work in Russia for 1883, both in Europe and Asia.

* Notices of books by other hands are signed with initials.—[Ed.]

ASIA.

Giappone e Siberia.—Note d'un Viaggio all' Estremo Oriente al seguito di S. A. R. il Duca di Genova, del Conte Luchino dal Verme, Colonnello di Stato Maggiore, opera illustrata da 229 incisioni e tre carte. Milan, 1885, Fratelli Trèves Editori.

Sommier, Stephen.—Un Estate in Siberia, di Stephen Sommier. 663 pagine, 144 illustrazioni, Rome, Florence, Turin, 1885. Ermanno Loescher.

After three centuries of more or less comparative repose, the Italians are once more on the tramp. No sooner were they rid of the Austrians in Milan and of the French in Rome, than they were reminded of what they owe to themselves as the countrymen of Marco Polo and Columbus. The books, of which we give the titles, may be taken as evidence of the interest they take in those regions of the far East, to which their diplomatists, traders, and missionaries, showed the way to European enterprise.

The first is the narrative of a voyage to the Eastern seas undertaken by the Royal Italian corvette *Vettor Pisani*, under the command of H.R.H. the Duke of Genoa, for several months surveying the coasts of China, Japan, and Asiatic Russia. It is written by Count Luchino dal Verme, a colonel of the Italian Staff, attached for several years as aide-de-camp to the Italian Prince, in whose suite he was, in the same capacity, at the time His Royal Highness was a student at Harrow. On the return of the corvette to Genoa, Count dal Verme parted company with the Duke, who allowed him to land at Vladivostock, on the coast of Siberia, whence he travelled alone all across the continent both of Asiatic and European Russia, his maritime log, continued as the journal of a land journey, ending at Nishni Novgorod and Moscow. This second edition of the work is a very great improvement on the original publication, not merely because it appears in a handsome quarto volume of 450 pages, with 229 excellent illustrations, very creditable to the artists engaged in it—as because the letterpress contains very valuable considerations of the author on the condition of the Siberian provinces under the Czar's rule, together with his conjectures as to the prospects of that huge empire in its extension over the whole North-Asiatic continent and the “manifest destiny” that urges it on from conquest to conquest—a matter on which English readers might not be unwilling to hear the opinion of an enlightened, impartial, and certainly not unsympathising alien.

The second book is the description of a run through Siberia by an enterprising traveller who sought a diversion in a summer tour down the valley of the tributaries of the Obi, following that stream further towards its mouth than other travellers had hitherto been willing to venture. The author, Signor Stephen Sommier, a native of Florence and a pure Italian, in spite of his Anglo-French name, is indefatigable both as a traveller and as a writer. He has published books which evince considerable proficiency in ethnological and ethnographical studies, and has been very diligent in his description of the various native races of Siberia with whom he came into contact. As evidence of his prodigious activity, and of the eagerness with which he pursues his favourite studies, we need only mention that he had barely returned from a long journey in the interior of Africa, when he left home last spring bound on his Siberian summer tour, and he had only come back from Siberia at the end of last September, when he left the manuscript of his Siberian work in the publisher's hands, and set out north again, bent on making his experiment of a winter in Lapland.—[A. G.]

Stolze, F., und Andreas, F. C.—Die Handelsverhältnisse Persiens. Petermann's 'Mitteilungen,' Ergänzungsheft Nr. 77. 4to., pp. 86. Map 1: 7,500,000. Gotha, Justus Perthes, 1885. Price 4 mark.

This is an almost exhaustive and methodical statement of the resources, industries, and commercial circumstances of Persia, which has been drawn up by Drs. Stolze and Andreas, with special reference to the recent German Embassy to the Shah. The authors have collected their materials from the most varied sources, and have drawn largely on British Consular and Embassy

Reports. The result is such as will be welcome both to the geographer and the merchant; the work must remain for a long time the standard authority on its special subject. In an introduction the authors point out the difficulty of obtaining trustworthy statistics in a country where statistics do not exist. They indicate the peculiar and complicated methods of collecting taxes and revenue, necessarily referring to the special features of the government of Persia. Considerable space is devoted to the geographical position of the country and its commercial products, involving a consideration of the character of the surface, the climatic conditions, and the raw products. In succeeding sections are treated the articles of import, posts and telegraphs, money, weights and measures, trade customs and rate of interest, trade routes, customs, Persian trade in general, position of European trade relations with Persia, embassies and consulates, the opening up of Persia to the trade of the world. Then follows, in French and German, the treaty of friendship and commerce between Germany and Persia, of June 11th, 1873, and several pages of statistical tables showing the trade of several years in various aspects.

Scott, James George.—*France and Tongking.* A Narrative of the Campaign of 1884 and the Occupation of Further India. London, T. Fisher Unwin, 1885: 8vo., pp. xiii. and 381, map and plans. Price 16s.

This volume will prove of interest as it not only contains a narrative of the Tongking campaign, but also describes the French colonies in Indo-China and the projects of the French there, no correct representation, the author believes, having been laid before the English public. The author acted as Special Correspondent in Tong-king, and the greater part of the volume is the result of personal observation. The map, on a scale of 60 miles to 1 inch, has been prepared for the work. The two plans, one of the triangle formed by Hanoi, Sontay, and Bacninh, the other of the Citadel of Sontay, are reduced by photolithography from two of a series of maps supplied to the French officers for the campaign. These maps were compiled from native sources.

Williamson, Isabelle.—*Old Highways in China.* The Religious Tract Society, 1884. 8vo., pp. 227, map and illustrations. Price 5s.

The authoress made four journeys in North China between the years 1873 and 1882, her object being to carry the Gospel to as many of the women of China as she could reach, and to familiarise them with Western women.

The first journey was undertaken in the autumn of 1873, viâ Weihien, Tsi-nan-foo, Tai Shan, and Ku-Foo-Hien ("the city of Confucius") and Tsou-Hien ("the city of Mencius"), returning by Mung, Yiu-hien, and Tsing-chow-foo; the second in 1875 to Weihien, Tsi-nan-foo, and back; the third in 1881 from Chefoo to Peking, as narrated; the fourth in the spring of 1882, partly on the 'Old Highways,' and partly on the byways and bridle-paths of the eastern portion of Shantung. Descriptions of the principal places visited are given, and also much interesting information derived from personal observation and experience of the habits and life of Chinese women. The map is a sketch of the Provinces of Shantung and Chih-Li and shows the routes of the authoress.

AFRICA.

Oliver, [Capt.] S. Pasfield.—*The True Story of the French Dispute in Madagascar.* With a Map. London, T. Fisher Unwin, 1885. 8vo., pp. viii. and 279. Price 9s.

This work appears to have been written by Capt. Oliver for a twofold purpose, viz. to furnish the public with a complete narrative of those events in the history of Madagascar which have terminated in the recent hostilities with France, and also, to promote the peaceful settlement of the difficulty. A supplementary chapter on the Malagasy mission to Europe, is contributed by Mr. F. W. Chesson, Hon. Sec. of the Madagascar Committee. The map which has been prepared for the work, shows the places bombarded by the French.

Shaw, George A. [F.Z.S.]—Madagascar and France, with some account of the Island, its People, its Resources and Development. Illustrations, 1 map, 8vo., pp. 320. London, Religious Tract Society, 1885. Price 6s.

Mr. Shaw is one of the agents of the London Missionary Society in Madagascar, and his imprisonment by the French Admiral and its consequences will be remembered. In the present volume eight chapters are devoted more or less to an account of the relations between France and Madagascar for the last two hundred years. In the other chapters there is much to interest the geographer and the naturalist, Mr. Shaw combining the results of his own observations with those of previous observers and writers. The first chapter gives a general sketch of the geography of the island; then follows an interesting chapter on Malagasy civilisation, and another on the origin of the Malagasy, in which he adheres in the main to the theories generally accepted. "Attempts to Colonise Madagascar from 1643 to 1814," form the subject of another chapter. One of the most original and instructive chapters is that on the present civil and religious state of the Malagasy, while the two concluding chapters deal with the fauna and flora of the island.

Sibree, [Rev.] James, and Baron, [Rev.] R.—The Antananarivo Annual and Madagascar Magazine. No VIII. Christmas, 1884. Antananarivo, L.M.S. Press.

The operations of the French around Madagascar have evidently not affected the varied activity of the English missionaries. This annual, at present edited by Messrs. Sibree and Baron, has appeared regularly since it was begun eight years ago, and for those interested in Madagascar, its geography, natural history, and people, it is of great value. The present number contains sixteen articles—linguistic, ethnological, botanical, zoological, social, geographical. Mr. H. E. Clark gives some interesting details on the mode of travelling in Madagascar. The Rev. A. Walen has a fourth article on the Sakalava, mainly on their social life, marriage and burial customs. Other articles are on "A Royal Kabary"; "Medical Work in Madagascar," by a Non-Professional; "Some Popular Malagasy Superstitions," by the Rev. S. E. Jorgensen; "Malagasy Dictionaries," by the Rev. W. E. Cousins; "Studies in the Malagasy Language," by the Rev. L. Dahle; "Proverbial Illustrations of Malagasy Life and Character," by the Rev. J. A. Houlder; "The Want of New Words in the Malagasy Language: another way of supplying them," by the Rev. S. E. Jorgensen. There are several natural history notes of importance, and the rainfall at Antananarivo for four years. The article of greatest geographical interest is by the Rev. L. Dahle, on "Geographical Fictions with regard to Madagascar." The writer, after referring to various fictions from Marco Polo downwards, examines the professed narrative of J. Audebert, which appeared in *Globus* in 1882, under the title of "In the Country of the Voilakertra in Madagascar." M. Audebert explored the north and centre of the island from 1875 to 1880, and professes to have journeyed from the southern coast up the Mambato river to near its sources, in search of a strange animal, "Aombi tse' aombi" (songomby?), which the natives reported to be much like an ass; but it never made its appearance. M. Audebert gives details of tribes ruled over by kings, and engaged in constant warfare; mentions animals, plants, and shells in a vague way, and towns he locates with dangerous precision. Mr. Dahle, who has been in the country since 1870, never heard of M. Audebert being in the island, and proves that several of his statements are grossly erroneous. Other missionaries whom he knows have traversed the very districts referred to by M. Audebert, have never heard of him, nor any tribe named Voilakertra. Mr. Sibree appends a note to Mr. Dahle's paper, confirming from his personal knowledge and that of his brother missionaries the conclusion of Mr. Dahle that M. Audebert's journeys exist only in his imagination, and that his narrative has been based partly on previous works on Madagascar, some of them, like that of Leguevel de Lacombe ('Voyage à Madagascar et les Iles Comores'), themselves largely indebted to the writers' imagination. No doubt the editor of *Globus* inserted M. Audebert's "narrative" in perfect good faith: but for

the sake of students, geographers, and future writers, it is right that its real character should be made known.

Wauters, A. J.—*Les Belges au Congo*. Institut National de Géographie. Folio pp. 24. Bruxelles. [1885.] Map and illustrations. Price 3 francs.

This is an interesting number of 'Le Mouvement Géographique,' which is edited by M. Wauters. Its object is to give a brief sketch of the events which have led to the founding of the Congo Free State, and to afford an idea of the present condition of affairs along the river. After a short introduction, the information is arranged under the following heads:—The Brussels Geographical Congress and the International African Association; the Five Belgian Expeditions to the East Coast; Boma, the Belgian Sanatorium and Factory; the Kwilu; Stanley Pool and Leopoldville; the Congo Flotilla; Captain Hanssens on the Upper Congo; the Stations of the Upper Congo; the Stations of Bangala and Stanley Falls; the Berlin Conference, under which the leading provisions agreed to are given; Stanley; the First Expedition of the Comité d'Études; the Congo International Association; the Caravan of Elephants; Tanganyika; the Congo; the Comité d'Études du Haut Congo; Table of the 45 Stations of the Association; Tabular List of the Belgians who have participated in the Expeditions. The information, it will thus be seen, is somewhat miscellaneous. The publication is profusely illustrated, with portraits of the King of the Belgians, Mr. Stanley, Colonel Strauch, and the leading officers who have taken part in the work, as well as views of some of the stations on the river. On the cover is a convenient chronological *résumé* of the principal events in the history of the 'African Work,' from the opening of the Brussels Congress, September 12th, 1876, down to December 27th, 1884. Of the white personnel on the Congo on December 31st, 1884, 49 were English, 46 Belgian, 37 Swedish, 20 German, 6 French, 3 Danish, 3 Dutch, 2 Italian, 2 Portuguese, 2 Austrian, 1 American.

AMERICA.

Boas, Franz [Dr.].—*Die Wohnsitze und Wanderungen der Baffinland-Eskimos*. Map. Deutsche Geographische Blätter, Heft i. Band viii. Bremen, 1885.

Dr. Boas gives the results of his observations on the Baffin's Bay Eskimo during his stay at Cumberland Sound in 1883-4. He divides them into seven stems which show considerable differences in dialect, house-structure, method of driving sledges, and religious customs. He gives details concerning the following six:—Seikossuiliarmiut on the extreme south-west; the Akudliarmiut on the north coast of Hudson Strait; the Nugumiut on the peninsula between Cumberland Sound and Frobisher Bay; the Okomiut in the Cumberland Sound region; the Akudnirmiut on the coast of Davis Strait, from Cape Searle to Cape Eglinton; the Aggomiut on the rest of Prince Regent's Inlet.

Bourke, Captain John G.—*The Snake-dance of the Moquis of Arizona*, being a narrative of a journey from Santa Fé, New Mexico, to the villages of the Moqui Indians of Arizona; with a description of the Manners and Customs of this peculiar people, and especially of the revolting religious rite, the Snake-dance; to which is added a brief dissertation on Serpent-worship in general, with an account of the Tablet-dance of the Pueblo of Santo Domingo, New Mexico, &c. Sampson Low & Co., 1884: 8vo., pp. xvi. and 371, xxxi. plates. Price 21s.

This fine old-fashioned title-page gives so satisfactory an idea of the nature of Captain Bourke's instructive volume that little need be added. The author in the performance of his official duties had unusual opportunities of becoming acquainted with the Indians of the South-western Territories, and he had every inclination to take advantage of these opportunities. He collected a mass of notes which have been freely drawn upon in the preparation of the present volume. Amid a setting of incident and topographical description he paints for us the curious ceremonies of the Moqui branch of the Pueblo Indians, ceremonies which are undoubtedly a survival of old heathen rites which Christianity has been able only slightly to modify. These Moquis, like other

Pueblo Indians, live in curiously constructed and fortified villages, located on hill-sides and precipitous cliffs, and here they have remained since the Spanish conquest. The snake-dance, so graphically described by Captain Bourke, points, no doubt, as ethnologists will recognise, to the ancient worship of the creature as the badge and deity of a particular gens. The young men handle their snakes—rattlesnakes they are—in the most daring way, holding two of them, for example, writhing in their mouth. No doubt, some means is taken, before the actual ceremony, of diminishing the virulence of the creatures' power, probably by making them bite pieces of cloth. The main value of the work is that it presents for the study of the scientific ethnologist a description of a state of society which has been but slightly modified since these Indians came within European ken. Of the plates sixteen are in chromolithography.

Hettner, [Dr.] Alfred.—Die Sierra Nevada von Santa Marta. Petermann's 'Mittheilungen,' 31 Band, 1885, iii. Gotha, Justus Perthes.

A careful study of all that is known of the snow-capped mountains of Santa Marta, which form so marked a feature on the coast of Colombia, stretching eastwards from the mouth of the Magdalena river. Frequent reference is made to the papers of Mr. Simons in the Proc. R.G.S. for 1879 and 1881.

Soltera, Maria.—A Lady's Ride across Spanish Honduras. Edinburgh and London, W. Blackwood & Sons: 1884, 8vo., pp. 319, illustrations. Price 12s. 6d.

The authoress here recounts her adventures during a journey across Spanish Honduras, undertaken between the months of June and October 1881. A colony was being located at San Pedro Sula, and Maria Soltera was engaged by a certain Dr. Pope, the Agent of the Honduras Government, to take charge of the school which was being erected there for the colonists' children. On arriving at San Pedro Sula the whole enterprise was found to be frustrated. The authoress landed at Amapala, and crossed the country by Goascaron, to Aceituna, from which place she traversed the river Juan by Comayagua, the Arimesine, San Juan del Norte, across the river Juan by Comayagua, the Rio Blanco by Santa Yzabel, Maniobar, Coacal, Santa Cruz, Potrerillos, across the Palenque river to San Pedro Sula and Puerto Cortez. These places, together with the country traversed, are described in an interesting manner. The addition of a map showing the route of the authoress, as also an Index, would have added considerably to the value of this work.

AUSTRALASIA.

Bonaparte, Roland [Prince].—Les Derniers Voyages des Néerlandais à la Nouvelle-Guinée. Small 4to., pp. 41, map. Versailles, imprimerie de E. Aubert, 1885.

This is a reprint of a paper by Prince Roland Bonaparte in the *Bulletin* of the Paris Geographical Society, IV^e trimestre, 1884. After brief reference to Dutch voyages of 1875-7, the author gives more details of those which have been made both on the south and north coasts in 1879-83. Most of them were under the guidance of Controller J. Van Oldenborgh, the last voyage noticed being that of Mr. Van Braam Morris in 1883, described in the 'Proceedings' for March 1885. Altogether fourteen expeditions (if we may call them so) are referred to.

Chalmers, James, and Gill, W. Wyatt.—Work and Adventure in New Guinea; 1875 to 1885. Maps and illustrations. 8vo.; pp. 342. London, Religious Tract Society, 1885. Price 6s.

Although this little book is somewhat fragmentary and not well arranged, it contains not a few valuable additions to our knowledge both of the geography and the natives of New Guinea. The map of the south-east projection of New Guinea (50 miles to an inch) is not satisfactory; it is on too small a scale to be of much service in tracing Mr. Chalmers's journey. Mr. Chalmers joined the London Missionary Society's station at Port Moresby in 1877, and the present narrative is chiefly occupied with a record of his numerous journeys along the coast and in the interior in pursuit of his duties as a missionary, partly in con-

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pany with Mr. Lawes and Mr. Macfarlane, both whose names are well known in connection with New Guinea. The coast referred to in the narrative as having been visited by Mr. Chalmers extends from East Cape on the south-east to about the mouth of the Fly river. Landings were effected at many points and intercourse, as a rule peaceful, held with the natives. The navigation is generally described with some minuteness, and the directions given will no doubt be useful to succeeding visitors. Probably the most important parts of Mr. Chalmers's narrative are those which relate to his journeys in the interior; he has thus been able considerably to extend the range of our knowledge. It is seen that an almost continuous range of mountains runs from near the south-east coast right into the interior of the broad central part of the island. The Owen Stanley range is thus connected with the detached sections in the south-east and the Yule range in the north-west. There appears to be a narrow gap between the Yule range and the Albert mountains, the latter being continued north-east by the Sir Arthur Gordon range. Lying to the south of the south-east end of the Albert Mountains we find the Seville Hills, and about 80 miles north-west of these a group of four detached peaks, Mounts Gill, Almonde, and Charlton, and Aird Hill. Of course these indications must be regarded as somewhat rough, but still they help to fill up the blank interior; more precise and fuller information we may expect to obtain as a result of the English and German protectorates. The mouths of several new rivers are also added in Mr. Chalmers's map. Among the hills in the interior, north-east from Port Moresby, visited by Mr. Chalmers in 1879, there seems to be a considerable population. They erect houses on the tops of high trees, which are reached by long ladders. The country in some parts is described as very fine, with numerous plantations of yams, taro, sugarcane, and bananas. The population appears to be ethnically considerably mixed; some of the people quite light copper-coloured, and others very dark. The mountains inland from the Astrolabe range are very rugged and precipitous, with, in some places, a perpendicular face of rock many hundred feet in height. "A truly wild country," Mr. Chalmers writes. "What terrible convulsions of nature there must have been here ere these great boulders were displaced and rolled about like mere pebbles." In 1879 also a very careful exploration was made of the Gulf of Papua, the coast of which is described in considerable detail. Next year the Kubadi district, to the north-west of Port Moresby, was visited. A trip to Elema in 1881 is described; it is a coast-district, north-west of Freshwater Bay, watered by four rivers which are said to be the mouths of one river coming from the Albert Mountains. A short chapter is devoted to birds of paradise, and the final chapter contrasts the condition of East Cape in 1878 and in 1882. Mr. Gill's part of this volume, 78 pages, describes the visit he made to Port Moresby from Rarotonga in 1884, when he stayed seven weeks. He made excursions along the coast, and gives some natural history details of interest. Appended are lists of the Motu names of the months, and the Motu numerals. There are numerous good illustrations in the volume.

GENERAL.

Achelis.—*Methode und Aufgabe der Ethnologie.* Zeit. der Ges. für Erdkunde zu Berlin, 20 Band, Heft 1. Berlin, 1885.

The first part of a long and elaborate examination of the materials, the field, and the methods of ethnology, which we commend to those of our readers who occupy themselves specially with this department of geographical science.

Dawson, L. S. [Commander R.N.]—*Memoirs of Hydrography, including Brief Biographies of the Principal Officers who have served in H.M. Naval Surveying Service between the years 1750 and 1885.* Two parts. Part i. pp. [6] 133, no date. Part ii. pp. [2] 209. 1885. Im. 8vo. Eastbourne, Henry W. Keay.

Commander Dawson has done a service for which all interested in naval survey work and in exploration generally will be grateful. It is a task which must have involved much research, and the results are given in concise form. "The object aimed at," the author tells us, "has been to produce in a condensed form

a work useful for hydrographic reference, and sufficiently matter-of-fact for any amongst the naval surveyors of the past who may care to take it up for reference, and at the same time to handle dry dates and figures in such a way as to render such matter sufficiently light and entertaining for the present and rising generation of naval officers, who, possessing a taste for similar labours to those enumerated, may elect a hydrographic career." Commander Dawson has done well not to increase the size of his book by including Arctic work, the story of which has been so well and concisely told already, as he states, "by an eminent geographical authority." After referring briefly to ancient hydrography and geography, and to navigators and surveyors before the time of Cook, he enters into considerable details concerning the work of Cook and those who followed him. The number of names thus connected by Commander Dawson with hydrographic work is very considerable, and they include not only Englishmen, but numerous foreign surveyors and explorers, such as D'Entrecasteaux, Churrua and Fidalgo, Beautemps-Beaupré, Humboldt, Krusenstern, Kotzebue, Lütke, D'Urville, and others. In the second part are included many of the names of officers in the late Indian Navy who did excellent survey work. Of course the various hydrographers, from Dalrymple (1795-1808) down to Sir Frederick Evans, come in for lengthened notice. Not only are their own careers described, but the progress of hydrography during the tenure of office of each is detailed, so that the special services of a very large number of officers of all grades thus come in for special mention. The portraits of the hydrographers are an interesting feature; unfortunately no portrait of Captain Thomas Hurd (1808-23), Dalrymple's successor, has been obtainable. In the Appendix we have short sketches of the Indian Marine Survey and the United States Coast Survey; a useful chronological table of the principal geographical discoveries of modern European nations, and a sketch of the early history of chronometers and their introduction as aids to navigation in the Royal Navy. Each part has an index. It will thus be seen that Commander Dawson's work abounds in personal and scientific interest.

Jordan, W. Leighton.—The Winds. An Essay in illustration of the New Principles of Natural Philosophy. Third edition. London, David Bogue, 1885. Cr. 8vo., pp. viii. and 47, plate. Price 3s. 6d.

An abridged form of the first Edition, which was published in 1877. It consists of the third and fourth chapters, with slight modifications, of the author's 'New Principles of Natural Philosophy,' published in 1883.

Kloden, G. A. von.—Seen-Tabellen. Zeit. der Ges. für Erdkunde zu Berlin. 19ter Band 6tes Heft. Berlin, 1884.

A useful table giving the statistics of about 230 lakes, arranged alphabetically, with area in geographical square miles, square kilometres, and hektares, heights and depths in Paris feet and metres.

Steinhauser, Anton.—Die Geoplastik der Gegenwart in Oesterreich. Petermann's 'Mitteilungen,' 31 Band, 1885, iv. Gotha, Justus Perthes.

In this paper Herr Steinhauser indicates the progress in the construction of relief maps, especially in Austria; shows that both science, art, and mechanism are involved in producing a good relief; and advocates the general use of this form of map in schools as well as for other purposes. He gives some useful notes on the history of contour maps, which, of course, must be the groundwork of all reliefs of any scientific value.

NEW MAPS.

(By J. COLES, *Map Curator*, R.G.S.)

WORLD.

Deutschlands überseeische Beziehungen durch Reichsschutz, Reichsvertretung Reichspost. Übersicht der Europäischen Kolonien. Weltkarte in Mercators Projektion. Mit 12 Nebenkarten im gleichen Massstabe: Goldküste, Kamerún-Gebiet, Lüderitz-Land, S.W. Küste von Afrika, St. Lucia-Bai, Samoa- und Tonga-Inseln, Neu-Hannover, Gazellen-Halbinsel und Jaluit, verglichen mit dem Deutschen Reichslande, von Dr. Hermann Berghaus. Justus Perthes, Gotha. Price 2s. (*Dulau*.)

Supan, A.—Karte der Jahres-Isothermen. Aequatorial-Massstab 1:30,000,000 or 411 geographical miles to an inch. Wien, Hölzel. 4 sheets. Price 10s. (*Dulau*.)

EUROPE.

Bayern.—Positionen-Karte vom Königr —. Bearb. im topogr. Bureau d. k. b. Generalstabes. Scale 1:25,000 or 2·9 inches to a geographical mile. Sheets:— 526. Höchstädt. 527. Tapfheim. 642. Ziemetshausen. 668. Balzhausen. 669. Walkertshofen. 694. Eltringen. 695. Langenerringen. Price 1s. each. (*Dulau*.)

Elba.—Geologische Karte der Insel —. Scale 1:25,000 or 2·9 inches to a geographical mile. Unter wissenschaftl. Leitung d. Herrn Prof. Meneghini, Präsident d. R. Comitato geologico, herausgegeben. 1885. Mailand, 11 März 1885. Price 12s. (*Dulau*.)

Hebrides.—Outer — (Lewis and Harris), by J. Bartholomew. Scale 1:127,020 or 1·74 geographical miles to an inch. Reduced from the Ordnance Survey. A. & C. Black, Edinburgh.

This forms part of the series of reductions from the Ordnance Survey in course of publication by Messrs. Black; the elevations are shown by contour lines, and it is a map which seems specially suited to the wants of tourists.

Scotland.—Orographical Map of —, by J. Bartholomew. Scale 1:627,800 or 8·6 geographical miles to an inch. A. & C. Black, Edinburgh.

This map exhibits the physical features of Scotland very clearly by a system of colouring which varies at every 500 feet. The colours are carefully chosen, the map is well drawn, and the lettering clear.

ASIA.

Afghanistan.—Karte von —, u. den angrenzenden russischen und englischen Gebieten. Bearbeitet von Gustav Freytag. Scale 1:2,100,000 or 28·7 geographical miles to an inch. Wien, A. Hartleben. Price 1s. (*Dulau*.)

— Letts's Bird's-eye View of the Approaches to India, showing the Russian, Persian, English, and Afghan Boundaries, and the whole situation at a glance. Letts, Son & Co., Limited, London. Price 1s.

Central Asia.—Letts's large print Map of —. Chiefly compiled from British and Russian official plans and books. 2nd edition. Scale 1:2,850,000, or 39 geographical miles to an inch. With inset maps. Letts, Son & Co., Limited, London. Price 1s.

Cyprus.—A trigonometrical survey of the Island of —. Executed and published by command of H.E. Major-General Sir R. Biddulph, K.C.M.G., C.B., B.A., High Commissioner, under the direction of Captain H. H. Kitchener, R.E., Director

of Survey. Hill-shading by Lieut. S. C. N. Grant, R.E. 1882. Scale 1:63,360 or 0·87 geographical mile to an inch. 15 sheets, index, and title, in portfolio. E. Stanford, London, 1885.

This map is on the scale of one inch to one statute mile, and forms an atlas of fifteen sheets. The hills have been drawn in chalk and are printed in separate colours, thus preserving the clearness of the outline and writing. It shows the districts and sub-districts into which the island has been finally divided for administrative purposes; the roads that have been constructed, and the telegraph lines erected under the superintendence of English officers; it also indicates the vineyards and forests. Block plans of the towns and villages are given and with symbols distinguishing Moslem from Christian, and Greek and Turkish names are also given, and the identification of ancient cities, in distinct types. Heights of hills and mountains, towns and villages above the sea-level are frequently shown, and milestones with the mileage written against them, so far as they had been erected at the completion of the survey. Though several maps of Cyprus have been previously published, none of them have been the result of detailed survey, nor can they in any respect compare with that to which this notice refers.

AFRICA.

Afrika.—Karte von —, von J. I. Kettler und H. Müller. Scale 1:8,000,000 or 109·5 geographical miles to an inch. Weimar, Geograph. Institut. 4 sheets. Price 8s. (*Dulau.*)

— politische Wandkarte von —. Neu bearbeitet von R. Kiepert. Berlin, D. Reimer. 6 sheets. Price 8s. (*Dulau.*)

— Karte von —, von R. Andree und A. Scobel. Scale 1:10,000,000 or 137 geographical miles to an inch. Bielefeld, Velhagen und Klasing. 4 sheets. Price 1*l*. (*Dulau.*)

Gold Coast Protectorate.—Sketch Map of the divisions in the —. Scale 1:527,000 or 7·2 geographical miles to an inch. Compiled from official papers under the direction of H.E. William A. G. Young, Esq., C.M.G., Governor of the Gold Coast Colony. August 1884. Stanford's Geographical Establishment, London.

This is a very excellent map of the Gold Coast Protectorate, in which all corrections and additions to our previous knowledge of this part of the world have been made, up to the date at which it was published. The boundaries of the districts, as proclaimed in Government gazettes, are distinguished by different colours along the coast-line, and dotted lines in the interior. The heights above sea-level are given, as well as the depth of water in the rivers in the dry season, and the rate of current.

Nil-Länder.—Karte der —, vom Äquator bis zum Mittelmeer. Scale 1:6,000,000 or 82·1 geographical miles to an inch. O. Herkt. Glogau, Flemming. Price 1*s*. 6*d*. (*Dulau.*)

Soudan.—Letts's Map of the —, including the Nile, Red Sea, West Coast of Arabia, and Abyssinia. With a plan of Khartum. 3rd edition. Scale 1:4,100,000 or 56·1 geographical miles to an inch. Letts, Son & Co., Limited, London. Price 1*s*.

Suakin-Berber Route to Khartum.—Letts's Bird's-eye View of the —. Letts, Son & Co., Limited, London. Price 1*s*.

— and Matammeh.—Letts's Popular Map of the country between —. Scale 1:775,000 or 10·6 geographical miles to an inch. Letts, Son & Co., Limited, London. Price 1*s*.

AMERICA.

British Columbia.—Map of the Province of ——. Compiled and drawn by Edward Mohun, c.e., by direction of the Hon. W. Smithe, Chief Commissioner of Lands and Works, Victoria, B.C., 1884. Scale 1 : 1,580,000 or 21·6 geographical miles to an inch.

This map is drawn on the same scale as one published by Mr. J. W. Trutch in 1881; it is, however, carried three degrees farther north, and differs from it in both the style and extent of the hill-shading. Many of the elevations given in the 1871 map are omitted in the present one, and the hill-shading is hardly sufficiently pronounced to convey a correct idea of the country bordering on the Cascade Range, or the Cariboo and Kootenay districts. Mr. Mohun, the compiler of this map, having resided in British Columbia for nearly twenty-two years, the greater part of which has been spent in the service of the Government on Indian work, has acquired a knowledge that enabled him to place on the map which he has presented to the Society, the geographical positions and names of the various Indian tribes. The boundary between British Columbia and Alaska has been laid down in this map in accordance with what Mr. Mohun considers to be the terms of the treaty between Great Britain and Russia in 1825; but the provisions there mentioned are contradictory according to the Admiralty Charts, and nearly all the maps published in the United States and Canada assign different positions to this boundary, many of them placing it considerably farther inland than the compiler thinks justifiable by the terms of the treaty; this, however, seems to be a point that can only be decided by a joint Boundary Commission. With the completion of the Canadian Pacific Railway, which brings British Columbia into prominent notice, there can be no doubt that this map will be extremely useful to all interested in the Western Province of the Dominion of Canada, and if some inaccuracies should be discovered, as doubtless they may be, it must be remembered, that, to produce an absolutely accurate map of such a rugged country as a large portion of British Columbia is, would entail years of labour by a scientific surveying staff, as well as a very large expenditure of money, and those who have travelled in this part of the world will recognise in Mr. Mohun's map the outcome of a thorough knowledge of the country, combined with skill in its compilation.

Sonora.—Official Map of the State of ——, Mexico. Compiled from surveys, reconnoissances, and other sources. Scale 1 : 1,255,000 or 17·2 geographical miles to an inch. By Chas. E. Herbert, c.e., 1885.

This map of the State of Sonora is drawn on a larger scale than any yet published, and contains details not to be found in other maps of the same country.

United States.—Philip's New Map of the ——, by John Bartholomew, F.R.G.S. Scale 1 : 3,700,000 or 50·6 geographical miles to an inch. Published by G. Philip & Son, London and Liverpool. On rollers, mounted and varnished. Price 17. 1s.

— By John Bartholomew, F.R.G.S. Scale 1 : 2,670,000 or 36·5 geographical miles to an inch. Published by G. Philip & Son, London and Liverpool. On rollers, mounted and varnished. Price 27. 2s.

Uruguay.—Mapa de la Republica Oriental del ——. Litografia, Tipografia y Encuadernacion de la Escuela de Artes y Oficios, Montevideo, 1884. With letterpress.

OCEANIA.

Neu-Guinea und Nachbarinseln, Neu-Britanien, Neu-Hannover, Salomons-Inseln, Neue-Hebriden, Neu-Caledonien. Scale 1:800,000 or 10·9 geographical miles to an inch. Deutsche Kolonialkarten, No. 4. Herausgegeben von der Weimar Geographischen Institut. Price 1s. (*Dulau*.)

New Guinea or Papua.—Scale 1:8,400,000 or 101·3 geographical miles to an inch. W. & A. K. Johnston, Edinburgh and London, 1885.

Polynesien, Karte der Deutschen Besitzungen in West ———, von B. Hassenstein. Justus Perthes, Gotha. (*Dulau*.)

INDIAN OCEAN ISLANDS.

Madagascar.—Carte de l'Île de ———, d'après les travaux de A. Grandidier. Paris, E. Andriveau-Goujon. Price 1s. 6d. (*Dulau*.)

Réunion.—Carte de l'Île de la ———, par P. Lépervanche, gravée par F. Dufour. Scale 1:50,000 or 1·4 inches to a geographical mile. 4 sheets. Paris. (*Dulau*.)

CHARTS.

Admiralty.—Charts and Plans published by the Hydrographic Department, Admiralty, in March and April 1885.

No.		Inches.	
1753	m =	2·2	Ireland, east coast:—Belfast lough. Price 2s. 6d.
556	{ m = m =	{ 0·95 3·90	South America, Magellan strait:—Anchorages in Famine and Froward reaches.—Coast and anchorages between Glascott point and cape San Isidro. Fortescue and Cordes bays, and port San Miguel. Carreras bay. Snug bay. Price 1s.
657	m =	0·5	Central America:—Isthmus of Panama, showing the proposed Panama canal, and the railway. Price 1s. 6d.
594	d =	1·4	Africa, west coast:—River Gambia to cape Lopez and Anno Bom, including the bight of Biafra. Price 2s. 6d.
238	m =	4·0	Africa, east coast:—Kilifi river. Price 1s.
675	m =	12·0	Red sea:—Trinkitat harbour. Price 1s.
912	m =	various.	Eastern archipelago:—Anchorages in islands of the north-west part of New Guinea—Etbe anchorage. Anchorage on eastern side of Esplee island. Anchorage on south side of Geby island. Port Fow. Pulo Siang. Offak harbour. Rawak and Kabarei bays. Piapis harbour. Marchesa bay. Ansus harbour. Price 1s. 6d.
2760	Plan added. Boeboe.		
1508	Plans added. Tongoa anchorage. Walurigi anchorage. Duin-dui anchorage. Wea-sisi bay.		
856	Plans added. Malua bay. Sah Sun bay. Massevonu anchorage. Losolava anchorage.		
2080	Plan added. Aliwal shoal. (<i>J. D. Potter, agent.</i>)		

CHARTS CANCELLED.

No.		Cancelled by	No.
1753	Belfast lough.. .. .	New plan, Belfast lough	1753
2021	Panama railway across the Isthmus	New chart, Isthmus of Panama, showing the proposed Panama canal, and the railway	657
556	Ports and anchorages in Magellan strait.. .. .	New plans, anchorages in Famine and Froward reaches	556
594	Gambia river to cape Lopez and Anno Bom	New chart, River Gambia to cape Lopez and Anno Bom	594
915	Geby island anchorage, Fow and Piapis harbours	New plans, anchorages in islands on north-west part of New Guinea	912
916	Aiou or Yowl, and Syang islands..		
914	Waygiou island anchorages.. ..		
912	Selang harbour		
1430	St. Lewis sound to Esquimaux islands	Plan of Blanc Sablon bay, from this sheet, has been transferred to No. 284.	

CHARTS THAT HAVE RECEIVED IMPORTANT CORRECTION.

No. 2535. England:—Coast Guard Stations. 2586. Scotland:—Coast Guard stations. 2587. Ireland:—Coast Guard stations. 2017. Ireland, south coast:—Dungarvan harbour. 2057. Ireland, west coast: Westport Bay. 120. North Sea:—Schelde river. 2680. France, north coast:—Havre roadstead. 74. Spain, north coast: Portugaleta and Bilbao. 142. Mediterranean:—Gibraltar strait. 1129. Mediterranean, Sardinia:—San Pietro channel. 2835. Black sea:—Delta of Danube river. 284. Newfoundland, west coast:—Cowhead harbour to Ste. Genevieve bay. 2028. Cape Breton island:—Mabou harbour. 414. West Indies, Cuba:—Havana harbour. 2852. Gulf of Mexico:—San Luis, Aransas, and Corpus Christi passes. 2545. North America, west coast:—Monterey harbour, Santa Barbara, &c. 814. Bay of Bengal:—The Sandheads, False point to Mutlah river. 942a. Eastern Archipelago:—Eastern portion. 2160. Eastern Archipelago:—Carimata strait. 134. South Pacific ocean:—Plans in New Hebrides islands. 982. Caroline islands:—Truk or Hogolu islands. E Index chart:—France, Spain, Portugal, and Mediterranean. H Index Chart:—West Australia, Eastern Archipelago, &c. I Index Chart:—East Australia, New Zealand, &c. P Index chart:—Islands in the Pacific. (*J. D. Potter, Agent.*)

Dépôt des Cartes et Plans de la Marine.—Paris.—No. 3942. Côte Occidentale de France. Embouchure de la Loire. Partie Nord. 1884. Feuille IV.—No. 3943. Côte Occidentale de France. Embouchure de la Loire. Partie Sud. 1884. Feuille V.—No. 4024. Mer de Chine. Golfe du Tonkin. Baie du Parseval. 1884.—No. 4026. Golfe du Tonkin. Grand Baie de Fai-Tsi-Long. Chenaux Intérieurs entre Ke-Bao et l'Île de l'Aigle. 1884.—No. 4027. Mer de Chine. Golfe du Tonquin. Baie de Ha-Long. 1884.—No. 4020. Mer de Chine. Golfe du Tonquin. Baie de Lan-Ila et Entrée Sud de la Baie de Halong. 1884.—No. 4011. Golfe du Tonkin. Baie d'Hone-Gay. 1884.—No. 4012. Golfe du Tonkin. Passe du Volta de l'entrée profonde au Mouillage de la Baie d'Ha-Long. 1884.—No. 4013. Mer de Chine. Golfe du Tonkin. Port Bayard. 1884.—No. 4010. Chenaux et Mouillages entrée les Baies de Ha-Long, Hone-Gay, et Fai-Tsi-Long. 1884.—No. 4029. Archipel du Cap Horn. Iles Wollaston. Mouillages des Iles Otter et de la Romanche. 1884.—No. 4035. Archipel du Cap Horn. Port Maxwell. Presqu'île Hardy. Croquis de la Baie St. Joachim.—

No. 4015. Archipel du Cap Horn. Ile Hoste. Baie St. Bernard ou Baie Orange. 1884.—No. 3972. Ocean Pacifique Sud. Nouvelle Calédonie. De l'Ile Paaba à l'Ile Pott. 1883.—No. 4001. Nouvelles Hébrides. Malicolo. Côte Sud-Est. Croquis du Mouillage des Iles Maskelyne. 1884. Dépôt des Cartes et Plans de la Marine, Paris.

United States Charts.—No. 962. Polar Regions. Baffin Bay to Lincoln Sea. Showing the most recent discoveries. Feb. 1885.—No. 939. West Coast of Central America. Harbour of La Libertad. Feb. 1885.—No. 935. West Coast of Mexico. Chacahua Bay. Jan. 1885.—No. 933. West Coast of Mexico. Chamela Bay to Maldonado. Nov. 1884.—Pilot Charts of the North Atlantic Ocean. No. 4, April, No. 5, May, 1885. Published at the Hydrographic Office, Navy Department, Washington D.C., under the superintendence of Commander J. R. Bartlett, U.S.N., Hydrographer to the Bureau of Navigation.

ATLASES.

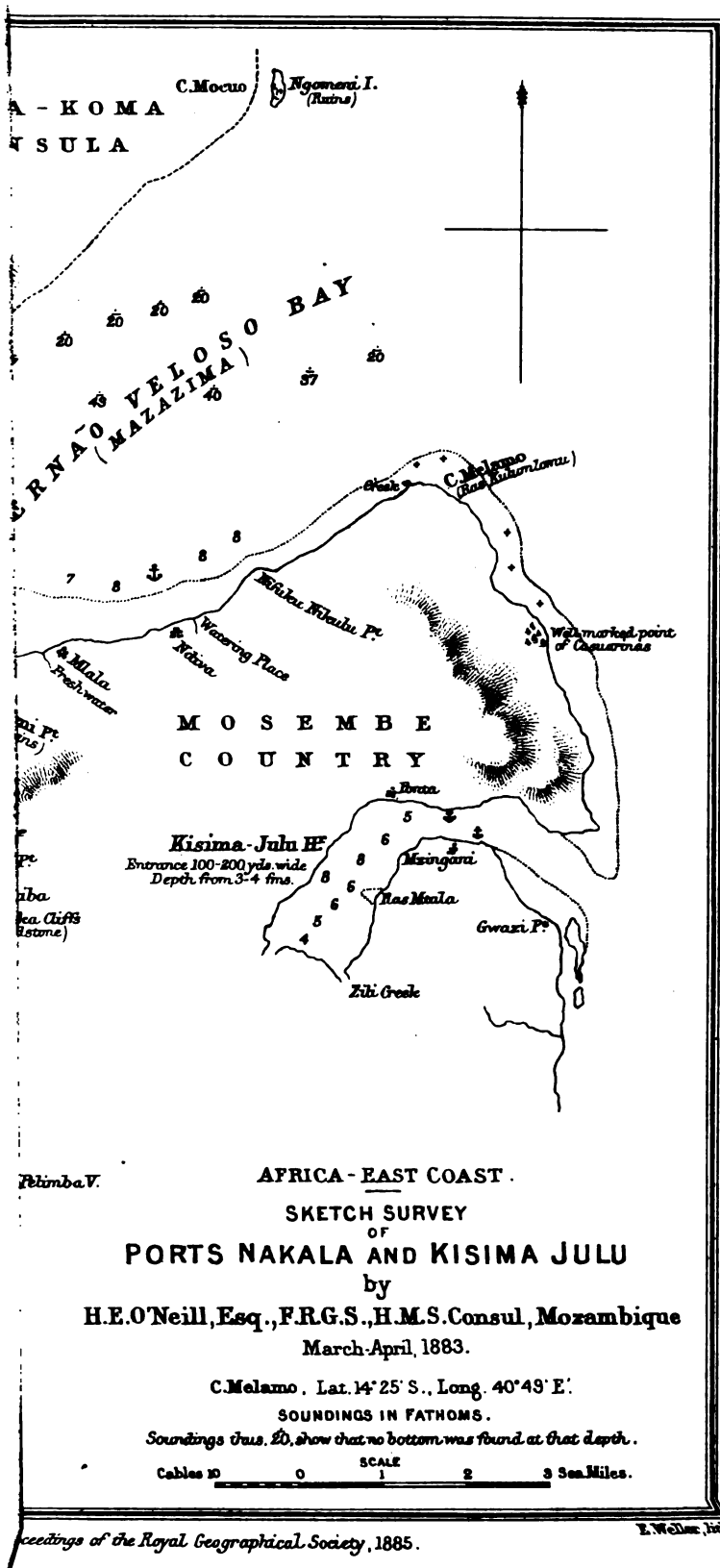
Bayern.—Topographischer Atlas d. Königr. —, bearb. im topograph. Bureau d. k. b. Generalstabes. Scale 1 : 50,000 or 1·4 inches to a geographical mile. Blatt 13. Ost u. West Lichtenfels.—18. Ost u. West Karlstadt. Price 1s. 6d. each. (*Dulau.*)

Droysen, Prof. J. G.—Allgemeiner Historischer Handatlas in sechsundneunzig Karten mit erläuterndem Text. Herausgegeben von der Geographischen Anstalt von Velhagen & Klasing in Leipzig unter Leitung von Dr. Richard Andree. Velhagen & Klasing, Bielefeld und Leipzig, 1885. 1. Lief. Price 2s. (*Dulau.*)

This is the first part of an Historical Atlas which is in course of publication by the firm Velhagen and Klasing of Leipzig, under the superintendence of Professor J. G. Droysen, and is intended to be a companion to Andree's admirable General Atlas, published at the same price and by the same firm.

The maps are clearly drawn in the same excellent style as those already published in Andree's Atlas, and will, when completed, form a most useful series of historical maps. The publishers undertake to issue a part of this atlas each month until it is complete, and as the same sort of engagements when heretofore made by this firm have been punctually performed, there seems every reason to anticipate that none of the vexatious delays, so common in connection with the issue of Continental serial publications, will take place. The following are the maps contained in the first part of this atlas:—Seite 5. Reisen des Apostels Paulus. Böotia und Attika. 6 u. 7. Griechenland. 8. Karten zur griechischen Geschichte. 29. Wettinische Lande um 1675. Welfische Lande. 30 u. 31. Deutschland im XIV. Jahrhundert. 32. Deutschlands Kreiseinteilung. Entwicklung der bayrischen Monarchie. 85. Südamerika. Die Südseeinseln. 86 u. 87. Kolonial- und Weltverkehrskarte. 88. Religionskarte der Erde.

Italiana.—Atlante della Marina Militare ——. Dedicato a S. A. R. Vittorio Emanuele, Principe di Napoli, dal Prof. Franc. Corazzini. Plate I. Marina Antica. Mit Vorwort und 9 Tafeln. Folio. Price 8s. 6d. (*Dulau.*)



PROCEEDINGS
OF THE
ROYAL GEOGRAPHICAL SOCIETY
AND MONTHLY RECORD OF GEOGRAPHY.

The Annual Address on the Progress of Geography: 1884-5.

By the Right Hon. LORD ABERDARE, F.R.S., President.

(Delivered at the Anniversary Meeting, June 8th, 1885.)

I COMMENCED my address last year with a reference to the practical failure of the Society's efforts to promote the study of geography in our schools, and by announcing the appointment of an Inspector to inquire into and report upon the state of geographical education both at home and abroad. The fact that during the sixteen years which had elapsed since 1869, the sixty-two medals given by the Society as the reward for proficiency, had only been awarded to sixteen schools, and that of these prizes, two schools—Dulwich College and Liverpool College—had carried off thirty, satisfied the Council that other and more energetic measures must be adopted, but only with the fullest knowledge of the methods pursued elsewhere, and of the success which had attended them.

Mr. Scott Keltie's Report on these subjects is only just completed, and has not been submitted to the consideration of the Council, but I have read enough of it to be able to say that it contains statements and recommendations of high interest and importance. Of the state of geographical education in Great Britain Mr. Scott Keltie draws a very dismal picture. "There is no encouragement to give the subject a prominent place in the school curriculum; no provision, except at elementary normal schools, for the training of teachers in the facts and principles of the subject, and in the best methods of teaching it; no inducement to publishers to produce maps, globes, pictures, reliefs, or other apparatus of the quality and in the variety to be found on the Continent; while our ordinary text-books are, as a rule, unskilful compilations by men who have no special knowledge of their subject."

This neglect is attributed to the "exigences of examination." Geography, as a class-subject, "does not pay. It is not recognised at the Universities by either professorship or readership; it does not find a real place at any of their examinations; while in the Army and Navy

examinations it is at a discount; and such geography as is given is of a very partial character, and is merely left to crammers." These unsatisfactory statements are justified by a large amount of evidence.

In striking contrast to this picture is that which Mr. Keltie presents of the state of geographical education in Germany, France, Italy, Switzerland, and several other countries of Europe. Germany, as might be expected, takes the lead, and does its work the most thoroughly. But the systematic study of geography is even there of recent creation. It prevails in twelve out of the twenty-one universities of Germany; and nearly all the twelve existing professorships of geography have been founded within the last twelve years. "The ideal aimed at, and being rapidly carried out, is to have one continuous course of geographical instruction from the youngest school-year up to the university." And Mr. Keltie deals with these ascending courses, showing in detail the teaching from the elementary to the higher schools, and in the universities. His examples of lessons he himself heard at some of these schools are most graphic, and suggest their high value in any course of intelligent education.

The subject of one lesson was Australia. It was "compared as to its prominent features with other continents; with Russia, Germany, England; peculiarities of coasts, gulfs, bays, islands, reefs; regions around Australia; general configuration of the land; mountain systems, table-land of interior. A boy was set to draw on a black-board a section across the continent from east to west, giving general height of the table-land and coast-ranges. Rivers—their sources, courses, fall, general characteristics, navigability, treated. Then came the prevailing winds, and the characteristics of the regions from which they come; their effects on the climate, first on the east coast, then on the interior." Then followed its vegetation; characteristics of the native population; the fauna; the discovery of Australia, and its division into colonies. A similar but somewhat more advanced lesson was heard by him on Central America and the West Indies. And at one of the universities Mr. Keltie found that Sir Rawson Rawson's admirable paper on the "Partition of Africa" had been taken up shortly before his visit, and all allusions—historical, ethnographical, physical, geographical—had been thoroughly gone into and cleared up.

What profit Germany has derived from these national studies, what spirit they have inspired into her intelligent and ambitious population, are hardly the proper subjects for discussion on this occasion and from this place; but I may perhaps be permitted to remark that if Sir Rawson Rawson wishes to keep his paper abreast with the times, he must speedily issue a new edition of it, indicating what additions should be made since last year to the colour representing the possessions of the German Empire.

I must refer you to the Report itself for an account of the efforts

made by France and the other countries of Europe to give to their school population the advantages of the best geographical education suited to each successive grade. But I may briefly refer to the conclusions at which Mr. Keltie arrives. These are clear, sensible, practical, but by no means encouraging. In all these European countries the curriculum is defined and imposed by the State, which, keeping the purse-strings, dictates the course of instruction. Except over our elementary schools, the State in this country exercises no such power, direct or indirect. We must be content to bring the force of public opinion to bear upon our schools and universities; for with them, and especially with our universities, rests the solution of this great question. Mr. Keltie's Report will be duly considered by the Council; it will doubtless be published; and means, I may venture to prophesy, will be taken to bring home to our educational authorities, with fresh power and urgency, the necessity for not allowing Great Britain to lag behind our political and commercial rivals, our rivals in human culture, in the systematic study of geography. In the meantime, during the course of the autumn, an exhibition will be formed of the results of Mr. Keltie's labours in collecting specimens of the best text-books, maps, globes, diagrams, models, and other apparatus used in teaching the various branches of geography. This done, it remains for me only to express the fervent hope that this latest effort of the Society to promote the studies which it was founded to extend, may meet with a large measure of success and tend to lay the basis of a sound and thorough national system of instruction in geography in all its branches, physical, political, and historical.

In my brief address on the opening of the new session of the Society last November, I noted the chief geographical events since the preceding May, giving especial prominence to the geographical results of the Greely Expedition to the north Polar region, and to the return of Mr. Joseph Thomson from his successful explorations in the Masai country. To these important events of our geographical year it will not be necessary to return. Since then many other interesting explorations have been undertaken or completed, and additions of greater or less extent to our knowledge of the earth's surface have crowded upon us. The principal of these I will now attempt to review.

Commencing with Asia. Some of the best-attended meetings of our Society during the past year have been devoted to papers and discussions on Asiatic subjects. In December you heard from General J. T. Walker, the late Surveyor-General of India, a luminous account of the four years' explorations in Eastern Tibet of the Pundit Krishna. The official report of Krishna's route survey appeared in the preceding year, and was noticed in my address at our last anniversary, but the paper of General Walker gave us some additional information, and was illustrated by a map, published in our 'Proceedings,' which contained important rectifications of

positions in the map originally published with the Report of the Survey. The Pundit's route on his return from Western China crossed the wide tract of previously unexplored country extending from the upper course of the Yang-tsze to the tributaries, or what are believed to be the tributaries, of the Brahmaputra, and as no river which could be taken to be the Irawadi was crossed, it was supposed that he had solved, once for all, the long-disputed question of the course of the Sanpo, adversely to those who believed this Tibetan river to be the upper stream of the Irawadi.

A thorough discussion of this controverted question occupied another of our evenings, when Mr. Gordon, the modern champion of the Sanpo-Irawadi theory, developed his views in a paper of great length, in which he gave an historical retrospect of all extant native information, and in conclusion keenly disputed the inference drawn from the Pundit's southern route, as to his having reached a tributary of the Brahmaputra. To his paper and to General Walker's argumentative reply, which are published together in our 'Proceedings,' well illustrated by maps, I must refer all those who take an interest in the subject.

The border-land between North-western Afghanistan and the Turkoman country, a district rendered doubly interesting by the great political question which it involves, and which it was not possible, as far as it concerned geography, to exclude from our discussion, formed the subject at another of our evenings devoted this session to Asia. The paper read on that occasion was a graphic description, by Major Holdich, R.E., of the region between the Heri-rud, near Herat, and the most northerly points reached by the British Afghan Boundary Commission, of which Major Holdich, our Associate, commands the survey party.

Whatever else may result from this great political dispute, a great gain has accrued to our geographical knowledge of the region. The preliminary map sent home by Major Holdich rectifies in many important points the erroneous topography in all pre-existing maps, and gives us a clear idea of the surface-configuration and physical condition of one of the most interesting districts in Central Asia. As far as regards the Upper Murghab, Major Holdich's information is in advance of that derived from Russian sources; but with regard to the Lower Murghab and the oases of Merv and Sarakhs, and the intervening desert, we are dependent solely on the Russian work. M. Lessar, who attended the meeting in question and took part in the discussion, has generously submitted to the Society copies of maps, the result of a topographical survey of the region by a party of Russian officers extending over a period of twelve months. A map which appears to be a reduction of these surveys has been published in illustration of M. Lessar's paper describing his latest explorations (in 1884) in the 'Bulletin of the Geographical Society of St. Petersburg,' early in the present year; and the same reduced map, translated, has been issued, as communicated by M. Lessar, in the recent 'Blue Book

on Central Asia' (No. 3, 1885). In these maps the courses of the rivers, with the varying width of their alluvial flats and the continuous border line which separates the river valleys from the desert are laid down, even up to the sources of the tributaries of the Kushk in the passes of the Burkhut range immediately to the north of Herat. We learn from another source that a map of the Merv oasis on a large scale (1 in 42,000) has been prepared in St. Petersburg, and that the area of the oasis has been ascertained to equal 2500 square miles.

Further east the indefatigable Colonel Prjevalsky has been recently again heard of from the centre of the continent, at Lob Nor. Last summer he explored the sources of the Hoang-ho and visited the Upper Yang-tszo, where it flows as a rapid and unfordable stream at an elevation of 12,700 feet, returning to his camp in the plain of eastern Tsaidam, in August. We now learn that he afterwards turned thence to the north-west, and visited in the autumn and winter Western Tsaidam as far as Lob Nor, crossing the previously unknown middle range of the Kuen Lun and the ancient route leading from Khoten to China. He discovered on the journey three lofty snow-capped peaks, all upwards of 20,000 feet above the level of the sea. In the middle of March he was preparing for a journey *viâ* Cherchen to Kiria, in the Khoten district, intending in the summer to traverse Northern Tibet, and thence to return to Russian Turkistan.

The Annual Report of the Survey of India is not published until later on in the year, after it has been officially reviewed by the Government of India; but a copy has been usually supplied in advance to the Royal Geographical Society, in time to be noticed in the annual address of the President, and the Society have always regarded this departure of the Indian Government from its usual routine of official procedure, as a valuable concession to the interests of geography. But this year the Annual Report has been delayed for some unaccountable reason, and has not yet been received. We have, however, every reason to believe that the Indian Survey Department has been fully employed in its varied and useful labours—astronomical, topographical, cadastral, tidal, &c.—so steadily carried on within the limits of the British Empire in India. And we know that outside those limits there has been much valuable geographical exploration.

A military expedition to punish a raid into British territory has enabled the survey officers to penetrate into the Zhob valley, a region which has hitherto been all but a *terra incognita*; it lies in the highlands to the west of the Sulimani range, and to the east of the road between Quetta and Kandahar, and its river is the principal affluent of the Gomul river, which is on the Ghazni plateau and flows through a gorge of the Sulimani range into the plains of Dera Ishmail Khan; in and around the Zhob valley, areas of about 5500 square miles of reconnaissance on the $\frac{1}{4}$ -inch scale, and of 400 square miles of topography on

the $\frac{1}{2}$ -inch scale are reported to have been completed; thus going far to fill in a reproachful hiatus in our present maps of Afghanistan.

The ascent of certain peaks in the Himalaya by an Alpine climber, Mr. W. W. Graham, an account of which was read by him at one of our meetings in June last, has attracted considerable attention in India.

Accompanied by the experienced mountaineer Herr Boss of Grindelwald, and an Alpine guide, Mr. Graham succeeded in 1883 in reaching within 30 feet of the summit of Mount Kabru in Sikkim (24,035 feet), and within 500 feet of the summit of Dunagiri, 22,700 feet, in Gurhwaï, besides making numerous other glacier expeditions.

Doubts, based mainly on the assertions of Bhootia peasants, have been expressed in the Indian press as to the heights reached by Mr. Graham's party, and it has even been alleged that they mistook for the gigantic Kabru a spur known as Kabur (15,827 feet), which does not reach the snow-level. Similar incredulity has accompanied the first ascents of new mountains in all quarters of the globe, and our Secretary, Mr. Freshfield (who has himself suffered from it in the Caucasus) has in the 'Alpine Journal' discussed in detail the points raised, and shown to the satisfaction of mountaineers that the doubts expressed had their origin in the failure of the writers to appreciate the part played by ice-craft in glacier exploration, and their readiness to accept the opinions hazarded by peasantry on feats entirely beyond the limits of Bhootia experience.

It will be remembered that Mr. Graham believed two at least of the peaks he saw north of Mount Everest to be higher than that mountain. The *Pioneer* of Allahabad of July 27 last stated that "Two of Colonel Tanner's assistants while triangulating in February 1884, six months after Mr. Graham's journey in Sikkim along the southern boundary of Nepal, noticed four or five peaks" further north which they think may possibly be as high or higher than Mount Everest. The "data" for computing the heights of these new peaks were to be completed during the past winter, and the publication of the result will be awaited with interest, though the surveyors' peaks and Mr. Graham's may not prove to be identical. Meanwhile the supremacy of Mount Everest will not be effectually disputed until the frontier ranges of Nepal and Tibet are thrown open to scientific examination.

The classical lands of Asia Minor have again this year been the subject of topographical investigation.

In the winter of 1882-3 a fund was raised by private subscription in order to effect explorations that might throw light on the antiquities and early history of the region. Mr. W. M. Ramsay was entrusted with the execution of this scheme, and travelled with this view, May to October 1883. He invited a scholar of the American School of Athens, Mr. J. R. S. Sterrett, to accompany him during great part of the summer. During that year's work the conviction grew up

that no adequate study of the history of Asia Minor was possible till the ancient topography was better known, and that no advance in the study of the ancient topography could be made till a better map of the country had been compiled. It was therefore found necessary, week by week, to pay a growing attention to the natural features of the country, the natural routes of communication, and the natural boundaries separating district from district.

The results of the summer's work seemed to the Royal Geographical Society to justify it in supporting the scheme, to which the Ottoman Railway Company, naturally interested in the further exploration of the country, also contributed; at the same time the antiquarian and historical results of this year's work induced the Society for the Promotion of Hellenic Studies and the Society of Antiquaries to aid the fund. In 1884, May 28 to September 11, Mr. Ramsay again travelled in the western parts of the central plateau of Anatolia. Mrs. Ramsay brought out photographic apparatus from England, went through the second half of the journey, and took a number of photographs of ancient monuments. Mr. Sterrett, who had joined in the expedition of 1883, was enabled by the Archaeological Institute of America to effect an independent exploration in 1884.

The work of 1884 was strictly complementary to that of 1883, the routes being all selected so as to complete those of the preceding year. Taken together, the work of the two years enables Mr. Ramsay, working from the line about 80 miles long measured by the Ottoman Railway Extension Scheme from east to west in Phrygia, to draw a magnetic map of almost the whole of ancient Phrygia, with the border districts of Pamphylia, Pisidia, Lydia, and Galatia (roughly speaking, a rectangle 120 miles N. to S. and 160 W. to E.), and to place on it, entirely from observations made by members of the two expeditions, about fifty per cent. more names of towns and villages than appear on Kiepert's map. As the astronomical observations which have been made to fix the position of a few towns in this district vary a good deal, a purely magnetic map has a certain value as an independent testimony. In addition, various corrections have been made in the course assigned by Prof. Kiepert to certain rivers, and some districts which are a perfect blank on the published maps have been filled by a rough survey. Mr. Ramsay has undertaken to read a paper on his explorations at one of our evening meetings next autumn.

Passing from the Asiatic continent to Australasia, the chief geographical events of the year relate to the least known and at the present time the most interesting portion of this region, namely, New Guinea. In the first place it is satisfactory to record that the Dutch have broken ground, at last, in the part of the northern coast of the island east of Geelvink Bay, to which they have long laid claim, without having occupied or explored it. In two exploratory trips, Mr. Van Braam Morris, Dutch

Resident at Tidore, has examined this part of the coast, and ascended the Amberno, which had always been reported by passing navigators, on account of its numerous supposed mouths, to be a large river with an extensive delta. The explorer ascended the stream in his steamer and found the navigation impeded by shallows at a distance of only 60 miles from the mouth. He further discovered that most of the openings in the coast led only to maritime lagoons, and concludes that the river is not of the importance that had been supposed. In compensation, however, he found, further to the east, another river, which is likely to be of some value in the future. A large tract of the same northern coast, commencing with the Dutch Boundary line, has been annexed by Germany, together with the large adjacent islands, New Britain and New Ireland, and the neighbouring archipelagos; we shall, therefore, probably not have long to wait for interesting discoveries in this quarter. Meantime with regard to the southern coast, over which Great Britain has claimed the Protectorate, much new information, geographical and ethnological, has recently been published by the well-known missionary, the Rev. James Chalmers, and his colleague, the Rev. Wyatt Gill, in a book entitled 'Work and Adventure in New Guinea, from 1877 to 1885.' Mr. Chalmers has visited many parts of this coast along a line of about 500 miles, and penetrated at various places further inland, by land, than any other European, and his descriptions of the country and the habits of the vivacious, excitable, and pugnacious race of savages with which it is peopled, merit careful attention at the present time. As you are aware, an attempt is about to be made by the experienced traveller, Mr. H. O. Forbes, to penetrate to the summit of the ranges, or plateaus, which extend along the centre of this part of the great island. Since he left England on this arduous mission some weeks ago, we learn that the Sydney and Melbourne branches of the Geographical Society of Australasia have offered to contribute to the expenses of this expedition, which is supported by grants by our Society, the Scottish Geographical Society, and the British Association. In other parts of Australasia the chief additions to our knowledge have been a survey of a large tract of new country in Central Queensland, by Mr. C. Winnecke, and the exploration of the King Country in the northern island of New Zealand, by Mr. Kerry-Nicholls, of which the explorer himself gave us an account at one of our evening meetings.

In Africa, the return of Mr. H. H. Johnston from his sojourn of five and a half months on Mount Kilimanjaro, and his address on the incidents of his visit and his explorations of the mountain slopes to a height of upwards of 16,000 feet, are among the most recent geographical events. Since then the brothers Denhardt, who had previously done excellent work in surveying the course of the river Dana, which flows from the southern slopes of Mount Kenia, have left again for East Africa. They have been commissioned, as we are informed, by the German African

Society, to take up a line of exploration, similar to that adopted with so much success by Mr. Joseph Thomson, but to follow it much further to the north than the point reached by our English traveller, namely, to the reported great lake Samburu, north of Lake Bahringo. Further north still, the year has witnessed the accomplishment of what may be termed one of the most interesting and difficult feats of all recent African travel. This is the journey of our Associates, Messrs. F. L. and W. D. James, the authors of the well-known book on the 'Wild Tribes of the Soudan,' who with three English companions, Messrs. G. P. V. Aylmer, E. Lort Phillips, and J. Godfrey Thrupp, organised an expedition and started last December to cross the north-eastern angle of Africa from Berbera to Mogadoxo. The hostile disposition and uncertain temper of the Somali tribes who inhabit this wide region, have hitherto offered invincible obstacles to its exploration by Europeans. Mr. James and his party, however, succeeded in penetrating 400 miles to the south, as far as Barri on the river Webbe, a point about 215 miles distant from Mogadoxo. The interior was found to be a plateau of an average elevation of about 4000 feet. Further details of the journey need not now be given, as we are promised a paper by Mr. James on the subject of his explorations at the next meeting of the Society. Before quitting this part of Africa, I must not omit to mention the large addition to our knowledge of the topography of the province of Harrar—from Zeila to Berbera, which has been furnished by the surveys of Major F. M. Hunter, our Political Resident at Aden, and Lieut. J. D. Fullerton, R.E.

With regard to the more southerly parts of Eastern Africa, and more especially the region between the Mozambique coast and Lake Nyassa, our knowledge has lately increased by leaps and bounds. This has been partly due to the journeys of the Rev. Chauncy Maples and Mr. Joseph Thomson in the northern part of this zone, filling up large lacunæ left by Livingstone and Bishop Steere, and partly to the Rev. W. P. Johnson, who for seven years has traversed with noble aims the rugged eastern shore districts of Lake Nyassa, and the banks of the Upper Rovuna and its tributaries; but the increase has been principally due to the systematic explorations of Mr. Consul O'Neill, one of our Gold Medallists of the year, regarding whose work it will be superfluous here to treat in detail. The general remark may, however, be permitted, that thanks chiefly to Mr. O'Neill we now have for the first time a fairly satisfactory knowledge of a region, varied in its physical configuration, well watered and fertile, which has hitherto remained a blank on our maps, notwithstanding the occupation of the coast by the Portuguese for nearly four centuries.

I cannot within the reasonable bounds of an Address enumerate all the numerous other explorations which have been completed during the year in different parts of this great continent. Some, however, have excited great interest, either in our own or in other countries, for Africa is now, and has been for some years past, a great field for enter-

prise, political, philanthropical, and scientific, open to all nationalities. Thus, M. Giraud has returned this spring from his exploration of Lake Bangweolo and its outlet, and his unsuccessful attempt to cross Africa by way of the Upper Congo; Mr. Arnot has crossed from Natal to the Bihé plateau by way of the Upper Zambesi; Mr. Montagu Kerr has crossed Matabele-land and the Zambesi, and penetrated by a new route to the south-western shore of Lake Nyassa; and Mr. Richards has reached from Inhambane the southern districts of Umzila's kingdom. In Western Africa further additions have been made to our knowledge of the Congo, chiefly by the publication of Mr. Stanley's long-expected book and the maps which accompany it, and by Messrs. Grenfell and Comber's careful survey of the middle course of the Congo and the Bochini tributary to the junction of the great river Kwango.

The members of the French Expedition on the Ogowé and the northern tributaries of the Congo have also been doing good work, in the survey of the territories newly acquired by France. M. de Brazza was occupied for six months prior to his descending the Alima to the Congo in the spring of 1884, in surveying and organising the means of communication between the Ogowé and the Congo, one result of his labours being that he has shortened the land route by 65 miles, having discovered a navigable tributary of the Ogowé, leading much nearer than the road previously used to the commencement of navigation on the Alima, on which river a small steamer has been launched. This is the fitting place to record the great change in the political geography of Equatorial Africa which has resulted from the labours of the Berlin Conference and the treaties between France, Portugal, and the Congo Free State during the meetings of the Conference. The map of Africa, with this and previous annexations of coast country, of which Sir Rawson Rawson has given us so excellent a description, has during the year undergone a complete transformation, and European Powers have taken upon themselves a largely increased responsibility for the security of travel and commerce and the general welfare of the natives, throughout vast tracts of the continent of which our knowledge is still extremely imperfect.

In South America a striking feat of exploration has been accomplished since my last address; the supposed inaccessible summit of Mount Roraima, on the confines of British Guiana and Brazil, was reached in December last by Mr. im Thurn and his companion Mr. Perkins, accompanied by a small party of Indians. The ascent was accomplished by way of the oblique ledge seen on the south-western side, by nearly all previous travellers, on the face of the cliff, the cliff apparently being uniformly vertical and from 1500 to 2000 feet high in every other part of the mountain mass. We have heard at one of our meetings a preliminary account of this interesting expedition by Mr. Perkins and are now expecting the fuller report, illustrated by map and drawings,

which has been promised by Mr. im Thurn. The party were able to remain on the summit but a few hours, but enough was seen of its strange aspect to show how promising a field it is for the researches of the geologist and naturalist.

In conclusion, I give the following brief summary of the Admiralty surveys of the year 1884, for which I am indebted to the Hydrographer, Captain Wharton, R.N. :—

The continuous prosecution of marine surveys in different quarters of the globe has been well maintained during the past year. The two home-surveying vessels have been employed, one on the west and the other on the east coast of Great Britain. On foreign surveys 60 officers and 500 men have been employed in four steam ships of war and five other smaller vessels. These ships have been at work in Newfoundland, the Bahama Islands, Magellan Strait, South Africa, Red Sea, Malay Peninsula, coasts of China and Korea, north-west coast of Australia, and amongst the Pacific islands.

The most important additions to our hydrographical knowledge are as follows :—

The survey of the little Bahama Bank will be shortly finished, and the same may be said of the southern shore of Newfoundland. The survey of the main strait of Magellan, to which reference was made in the last address, was completed early in the year. Many useful additions have been made to ports and salient parts of the coast of South-east Africa.

In the Red Sea the intricate approaches to Sawakin have been well laid down.

On the west coast of the Malay Peninsula, Penang Harbour has been re-surveyed and the positions of the islands lying to the north-west and forming the eastern boundary of the ordinary route of vessels to Malacca Strait have been accurately determined.

The unknown western shores of Korea, south of the approach to Seoul, for two degrees of latitude have been explored, and the main features of this island-studded shore laid down. New rivers and harbours have been entered, notably, the large river Yeun-san-gang, at the entrance to which stands the considerable town of Mokfo. There appears, however, to be little chance of immediate trade with Korea, in consequence of the absence of any valuable products and the scanty needs of the population. The southern approach to Haitan Strait on the Chinese coast, much used by British trade, has been re-charted.

On the difficult shores of Western Australia such progress has been made as the small means at the disposal of the surveyors has permitted.

In the Solomon Islands the Bougainville Strait has been charted. This channel will in the future be most probably a highway for traffic between Eastern Australia and Japan. Many additions have been also made to the charts of various groups of other Pacific islands.

The survey of the coasts of India carried on by officers of the Royal Navy and India Marine has been actively progressing.

Surveys of Rangoon, Cheduba, and other ports in the Bay of Bengal, as well as harbours on the west coast of Hindostan, have been made.

A re-survey of the great Canadian lakes has been commenced in Georgian Bay, where trade by water is on the increase.

These are, I believe, the principal events of the seven months which have elapsed since the beginning of this Session. To the politicians of all the great European nations the period has been one of intense interest and anxiety, connected more or less with questions of vast territorial acquisitions. To the geographer the interest, although less painful, has hardly been less keen. The French in Asia and Africa—the Russians in Central Asia—the English on the Afghan frontier, on more than one border of India, on all sides of Africa, and in Oceania—and the Germans on the East and West African coasts and among the islands of the Pacific and Australasian seas—the Italians on the Red Sea—have, while pursuing measures of national policy, made large additions to our knowledge of the globe, have settled some questions, have stimulated inquiry into others. Never—and I need hardly even except that period of emigration and invasion which precipitated and followed the break-up of the Roman Empire—has the ferment among nations been so wide-spread or prophetic of such great consequences. The foundations of new empires, new civilisations, are being laid over vast portions of the earth. To these our Society, divesting itself of all political jealousy and partisanship, cannot be blind or indifferent, while we strive to turn to the account of our favourite science the passion for expansion and conquest from which our fellow-countrymen are as little exempt as others. Out of the nettle, danger, we pluck the flower, knowledge, and we welcome as our fellow-workmen all who add to our stock, whether the territorial aspirations of their countrymen are displeasing to us or not.

These invading hosts have in their trains naturalists, ethnologists, geologists, men skilled in all the sciences which illustrate geography; knowledge and conquest thus march hand in hand, and however much we may deplore the scenes of violence which are the inevitable concomitants of war, prejudice alone can blind us to the important scientific results which follow upon the displacement of barbarous by civilised peoples, especially at a time when the rivalry of nations extends nearly as much to discoveries of science as to enlargement of power or territory.

OBITUARY FOR THE YEAR 1884-5.

As you have been informed by the Council Report, our losses by death during the year (ending April 30th) have been eighty-three, including four Honorary Members. In accordance with our custom, biographical notices of such of our deceased members as have distinguished themselves in connection with geography are given at the time in the obituary columns of our monthly 'Proceedings.' In this way have appeared during the year memoirs of Sir BARTLE FRERE, Sir FREDERICK BARLEE, Mr. J. T. THOMSON, General GORDON, K. VON SONKEAR, General Sir JAMES E. ALEXANDER, General C. P. RIGBY, and Mr. A. ADAMS-REILLY, besides a notice of Professor F. VON HOCHSTETTER in the "Geographical Notes." The list of deaths contains also the names of a large number of men who were eminent in various walks of life; it runs in alphabetical order as follows:—

Mr. JOHN BUCKLEY; Mr. W. BRAGGE; Professor H. BERGHAUS, the eminent geographical writer and author of the 'Physical Atlas'; Mr. JAMES BISHOP; Mr. THOS. BROWNING; Mr. GEO. BENTHAM, the celebrated botanist, joint author with Sir Joseph Hooker of the grand work 'Genera Plantarum,' and for many years President of the Linnean Society; Mr. WALTER BRODIE; Mr. WALTER R. BROWNE; Mr. H. A. BRIGHT, the author of the fascinating book 'A Year in a Lancashire Garden'; Mr. S. BOWRING; Mr. OCTAVIAN BLEWITT, the well-known Secretary to the Literary Fund; Mr. G. BATLEY; Rev. ALFRED BELLVILLE, who had spent many years in Eastern Africa, and in 1875 contributed a paper to our 'Proceedings' (vol. xx. p. 74) on his 'Journey to the Universities' Mission Station of Magila'; Mr. EDWARD SPENSER BURNS, son of Dr. Dawson Burns, one of the valuable lives lost in the pioneer work of the International Congo Association. He went out to the Kwilu river in 1883, and carried out with complete success an exploring expedition from the Kwilu to the Congo; he died of intermittent fever at Stanley Pool on the 1st of March, at the age of 24. Sir WILLIAM CODRINGTON; Mr. J. M. CHAMBERLAIN; Surgeon-Major W. H. COLVILL (Indian Army); Mr. EDW. COGHLAN; Mr. E. S. DOWLING; General CHARLES DE LANTZ, Military Attaché to the Russian Embassy in London; Mr. J. GREEN ELSEY; Capt. C. E. FOOT, R.N., Consul in the Lake Region of Central Africa, who died at his post on the Shiré on the 16th of August last; he was enthusiastically devoted to African exploration, and had made journeys of some extent inland from Zanzibar in former years; Capt. E. B. FAWCETT; Mr. H. M. S. GRÈME; Mr. T. CUNNINGHAM GRAHAM; Mr. CHARLES G. GIBBONS; Lord CLAUDE HAMILTON; Mr. H. C. HUGGINS; Commander P. A. HALKETT, R.N.; Mr. R. S. ILLINGWORTH; Mr. G. JINMAN; Sir WILLOUGHBY JONES, Bart.; Mr. H. BATESON JOYNER; Mr. J. JOHNSTONE; Sir C. M. LAMPSON, Bart.; Mr. W. C. LUARD; Mr. W. H. MUGGERIDGE; Mr. D. G. F. MACDONALD; Rev. Dr. J. O. MEANS; Mr. S. MENDEL; Mr. H. MURRAY; Mr. H. PARKES MCCLATCHIE; Mr. J. T. H. McEWAN; Mr. W. MACDONALD; Mr. JAMES MACDONALD; Mr. W. J. MANTLE; Dr. S. MASON; Mr. G. G. NEWMAN; Rev. J. E. PRYOR; Mr. T. PARRY; Sir HARRY S. PARKES, British Minister in China, and formerly filling the same high post in Japan. Throughout the long period in which he resided in Eastern Asia, Sir Harry Parkes had the interests of geography at heart. He had been a member of our Society since 1850, and contributed two papers to the 'Journal,' one in 1854 "On the Russian Caravan Trade with China" ('Journal,' vol. xxiv.), and the second in 1855 (vol. xxvi.), when he was Consul at Amoy, entitled "Geographical Notes on Siam." Mr. A. G. PULLER; Mr. G. LEWIS PARKIN; Rev. C. E. B. REED; Mr. GRAHAM MOORE ROBERTSON; Mr. EUSTRATIO S. RALLI; General R. RUMLEY, who served with the 6th regiment throughout the Kafir war of 1847; he died on the 12th of September; Mr. J. REMFREY; Rev. F. SILVER; Mr.

JERVOISE SMITH; Rev. E. H. MAINWARING SLADEN; Mr. G. CARTER STENT; Mr. A. SPÜHLER; Major-General Sir HERBERT STEWART, K.C.B., the heroic soldier who died at Gakdul, on the Upper Nile, on the 16th of February of wounds received in his victorious battle of the 19th of January; Mr. R. STEWART; Mr. W. H. TWENTYMAN; Sir R. R. TORRENS; Captain JOSEPH THWAITES; Dr. J. TUCK; Surgeon-Major J. R. THOMAS; Mr. EDW. WELLER; Mr. A. B. WYON; the Duke of WELLINGTON, who took formerly a keen interest in the Society and its work, and served on the Council in 1869 and 1870; he died on the 13th of August last.

Eastern Africa, between the Zambesi and Rovuma Rivers.

By HENRY E. O'NEILL, F.R.A.S., H.M. Consul at Mozambique.

(Read at the Evening Meeting, May 11th, 1885.)

Map, p. 496.

I HAVE been asked to give you a summary of my journeys in Eastern Africa. But I fear I cannot do this without inflicting upon you a "twice-told tale," and from that I would spare you. Most of my journeys have already formed the subject of papers read before your Society, and narratives of others have been sent to the Foreign Office, whence they have found their way into the Blue Books.

As I desire, however, to conform as much as possible to the wishes of your Secretary, I will, without entering into any lengthy details regarding them, tell you what they have been, how it came about that I undertook them and what some of the chief results are that have been attained by them.

In 1879 I had the honour of being selected to fill the post which fell vacant by the death of Captain Elton—a distinguished traveller, well known to your Society—whilst he was endeavouring to push his way from Lake Nyassa to the coast. I had previously served between three and four years in the Royal Navy in East African waters, and during that time had qualified as an interpreter in the Swahili tongue and gained an insight into the working of the slave trade which has been invaluable to me.

Let me then run over as briefly as possible the journeys I have carried out since residing at Mozambique.

In 1879 I was engaged in a survey of the Maputa river in Delagoa Bay. You will remember that we were then engaged in the Zulu war, and perhaps recollect the long delay that occurred in the advance of our troops, owing to a difficulty in finding means of transport. It was thought that a flank movement into Zululand might become necessary and whilst we were negotiating with the Portuguese Government with regard to the landing of troops upon the southern shore of Delagoa Bay, I pushed up the Maputa river to try its depth, look into the adjacent country and see how far it might be made available for the

carriage of troops. Having passed the farthest point at which the river was navigable for boats of two feet draught and made a sketch survey of the river from its mouth to that point, I returned to the coast to prove fully in my own person the truth of our great surveyor Captain Owen's remark that it was one of the most pestilential rivers of East Africa, up which he tells us his boats did not reach more than 45 miles, owing to the number of fatal cases of fever that occurred to their crews.

The next year I carried out an examination of the Northern Mozambique coast up to Cape Delgado. This examination was made in native boats and in them I visited every bay, river, and creek between Mozambique and that cape. There had been some conflict of opinion with regard to the extent of the export slave trade from this portion of the coast. In truth this was not surprising, for the greatest ignorance prevailed at Mozambique respecting the minor bays, ports and trading settlements upon the coast. They appeared only to be visited by the natives and it was only from these that I could gain information regarding them, and therefore it was felt that the best way of arriving at the truth would be for me to visit all points whence slaves could be shipped and make personal inquiries at them.

It was upon these journeys that I had the great good fortune to bring to light two ports within 40 nautical miles of the capital of the province, one of which, Nakala, has since been pronounced by a distinguished Portuguese Naval officer, Captain Castilho, now Governor-General of Mozambique, to be "one of the finest harbours in the world." Some minor errors were also corrected, such as that which connected the Mkubure river with the southern branch of Memba Bay.

Again, in 1881 and 1882, more coasting journeys were carried out, both north and south of Mozambique, and the geographical results of the latter were, the discovery of a dangerous patch of rocks off Ras Mtende within 20 miles of Mozambique; an examination of the notorious Kivolani-Umfussi lagoons with their five outlets and investigation of the theory put forward by Captain Le Hunt Ward, R.N., that they formed "the delta of a large unknown river." Sketch surveys were also made of Shangaji or San Antonio river, and of Angoche and the connection of the latter with the river Mluli, as well as the changes that of late years had taken place in the delta were pointed out. Information, collected on the spot, was also gained respecting the numerous rivers which discharge themselves upon this part of the coast, and endeavours were made, which subsequent journeys in the interior proved to have been successful, to discover the really important of these and to define their deltas.

It was upon these coasting voyages that I first formed and matured my plans for the opening up of the interior beyond the coast belt. As I moved up and down the coast I saw I was working upon the borders of a country of which we knew absolutely nothing and regarding which many existing impressions were incorrect. Accurate information

regarding it was indeed difficult to obtain. Rumours there were in plenty, chiefly to the effect that the inhabitants were of such a barbarous character that it was unsafe, almost impossible, for a white to go amongst them. It is only when we remember these reports and the credence given them that we can explain the fact that no Portuguese, within the past four centuries, had ever penetrated it.

Of the physical features of the country little or nothing could be heard worth retaining. I had moved across the mouths of many rivers, such as the Lurio, Mkubure, Ligonya, and Likugu, which showed by the depth and breadth and number of their outlets that they formed no inconsiderable streams. But whence they came, what was the direction of their courses, what the description of country they flowed through and drained, was all unknown to us.

At certain points mountain ranges, such as the Sorisa, in the neighbourhood of Pomba Bay, approached the shore, and their broken, rugged summits could be seen stretching away into the far interior, diversifying the face of a country the nature of which, from its apparently picturesque and varied character, greatly increased our wonder and interest concerning it. What altitudes these mountains attained, what was their formation and character, what the lines of direction the hill ranges took and what the nature and disposition of the people who inhabited them, were all points respecting which we were in utter darkness.

As to the danger of penetrating the country, as I voyaged along the coast inquiring unceasingly upon the country and people, my fears, founded upon reports that were generally credited by the whites of the coast, began to vanish. I noticed that the most deterrent stories regarding the Makua and Lomwe people were circulated by those who themselves traded amongst them. This trade, at a period by no means remote, had consisted almost entirely of slaves, and I knew well, for in other African districts I had witnessed it, the dread of strangers and exclusiveness that the slave trade creates amongst a people who suffer from it.

Of these tribes my predecessor had written: "The fear of slave-dealers—their tracks are marked by many a burned and desolated settlement—has engendered a suspicious uneasiness among the villagers for so many years that it has now become an innate feature of the Makua character, is marked upon their faces, and colours every action of their lives. No communication with a stranger or an adjoining tribe is allowed without express permission from a large 'baraza' of chiefs. The Lomwe country lying between Makuani and Lake Nyassa may not be visited, under pain of capital punishment, unless express permission be beforehand gained. Tracks of country are purposely laid waste and desolated upon the frontiers, where armed scouts—generally old elephant hunters—continually wander, their duty being to report at the earliest moment any approach of strangers, who are invariably treated as

enemies." These words of Captain Elton well describe the notions that then prevailed upon the coast respecting the Lomwe tribe.

It was to discover how far they were true that I started, in the summer of 1881, from Mozambique with a party of thirty carriers, and although I looked upon that journey as only an experimental one, I succeeded in passing over more than 500 miles of new country and I satisfied myself that it was quite possible for a stranger to pass, with a well-conducted caravan, throughout the length and breadth of the Lomwe country, and I then determined, as soon as permission was given me, to open up a road from Mozambique to Lake Nyassa. I will not enter here into any of the geographical results of this journey as a paper upon it has already been read before your Society, in April 1882. Sufficient to say they proved that when the coast belt was once passed you entered a fertile, picturesque, and healthy country, and ridded us, once and for all, of the notion that the Lomwe were a barbarous and bellicose people.

I failed to gain permission from the Foreign Office to renew, in 1882, my attempt to cross from Mozambique to Lake Nyassa, so in that year I carried out two more coasting voyages and a short land journey, of a month's duration, in the country west of Cape Delgado Bay. Upon this journey I was fortunate enough to discover the Lake Lidedi, a small but beautifully situated lake at the foot of the Mavia plateau and discharging into the Rovuma river. I also succeeded in penetrating the outskirts of the country of the Mavia, a tribe who had never before permitted a European to visit them.

In 1883 I became entitled to five months' furlough, and receiving permission from the Foreign Office to pass it in travel in the interior, and aided by a grant from your Society, I left Mozambique, immediately the rains were over, for Lake Shirwa and the Nyassa. Again I will not enter into any details, for you have only recently, in November and December of last year, had papers upon this journey published in the 'Proceedings.' This was perhaps the most important of all my journeys, as I was able to make a running survey of the whole route between Mozambique and Lake Shirwa; a survey which I think will prove fairly correct, as over 2000 observations were taken upon it, all of which have been reported as perfectly satisfactory by the scientific staff of your Society. Some interesting points, such as the Inagu and Namuli Hills, were crossed, and the position and altitude of the range which forms, in this part of Eastern Africa, the outer edge of the great Central African basin, were defined and fixed.

From Lake Shirwa a detached expedition was made to the northward, which resulted in the discovery of the Lakes Amaramba and Chiuta, and the cutting off of a considerable portion of Lake Shirwa, which, it was found, had been carried, upon our maps, 14' too far to the northward. As a return was made to the coast by a more southerly route,

which terminated a hundred miles south of Mozambique, two routes were opened up upon this journey from the Lake district.

It is only left to me now to tell you of my travelling work last year. Called up the Zambesi and Shiré rivers by a difficulty we were having with our old friends the Makololo, I landed at Chironzi upon the Shiré and travelled by a circuitous route that led me outside the Makololo country, which I skirted and left to the westward. In doing this I was able to trace for some distance the course of the Ruo and some of its tributaries, and to correct the position of some well-known mountains, such as Chipironi—sometimes called Mount Clarendon—and of Mount Milanji.

At Blantyre I remained no less than seven weeks, and I hope I shall not be accused of a spirit of boasting when I say that it was here I think my best work has been done. I knew how sorely cartographers had felt the want of a reliable meridian in the Central Lakes districts. Upon all my previous journeys I had myself felt how great the advantage would be if the longitude of one place in the interior was really accurately fixed.

The area of unknown country in Africa is being rapidly diminished, and year by year recedes farther into the interior. Travellers working with chronometers and half-chronometers to obtain their longitude, start from the coast and have a journey of a month or more to perform before they even arrive upon the threshold of the field of their explorations. Upon this journey their chronometers have been jolted upon the heads of blacks, subjected when on the march to very high temperatures under an almost vertical sun; subjected also to different degrees of atmospheric pressure, if the country passed over has been mountainous, and to great changes perhaps in the degree of humidity of the atmosphere.

These chronometers, it may be assumed, have been carefully rated on the coast and their errors on Greenwich mean time and rates obtained at some well-determined point. But it is in the highest degree improbable that, under such varying and unfavourable conditions, they have preserved their rates undisturbed, and consequently, before the traveller has even arrived upon the field he is intending to explore, his error on Greenwich mean time is in fault, and therefore, of course, his observations for longitude.

This state of things I saw would not be remedied until we had a meridian in the interior so reliably fixed that it could be classed amongst those known as the "secondary meridians" of the globe. By a "secondary meridian" I mean one unconnected by electricity with Greenwich or other well-marked spot, and which has had therefore to rely entirely upon astronomical observation for its determination. The meridian should be so placed as to be easily accessible to travellers in the Central Lakes districts, and the countries adjoining them.

No point, it appeared to me, could be better chosen than Blantyre

for this. Steam communication upon the Zambesi and Shiré rivers has placed it, you may say, upon the threshold of the unknown country bordering the Central Lakes. It is situated upon the great natural highway from the eastern seaboard into the heart of Africa, and therefore it is upon the route that would be chosen by the majority of travellers. It is the centre of a large and important mission station—that of the Scotch Established Church, branches from which are spreading in every direction; and a flourishing trading company—that of the African Lakes, possessing stores of every description, from which a traveller may obtain all he wants, have made it their headquarters. And finally, it is placed upon such bracing and healthy highlands that travellers may often seek it as a sanatorium and return there to recruit their health as well as to re-equip their expeditions.

My desire to get the meridian of Blantyre classed as a “secondary meridian” may seem to have been a presumptuous one for a single person to entertain. But let me say at once that I never permitted myself to hope that I should be able, alone, to place a sufficient number of observations in the hands of astronomers and cartographers at home to enable them to class it as such. I know the years of labour considered requisite and the thousands of observations that were taken by those astronomers who occupied observatories upon the “secondary meridians,” before they considered their longitudes to be accurately fixed, and this with far more perfect instruments and infinitely greater skill than I could bring to bear upon the work. I was perfectly aware that whatever I did could be nothing more than a small contribution towards the work that would have to be done before even a moderate degree of accuracy was attained. A beginning, however, would have to be made by some one, and I felt I should be well rewarded if what I did formed a nucleus of future work and induced others to continue the observations I had begun.

During the seven weeks in which I thus employed my leisure I obtained about 1200 observations for longitude of different kinds. As stars were of course preferred to the sun most of this was night work. I should have been able to obtain a far larger number had the weather been more favourable. But June and July in the Shiré highlands, though the coolest and pleasantest months, are also the cloudiest and wildest; strong winds and overcast skies prevented me from observing as often as I wished, and frequently, from the disturbing effects of the wind upon the artificial horizon, compelled me to reject observations I had taken. These observations are not all yet computed, but the result, as far as they have been, is to throw Blantyre 8'·3 to the east of the place it occupies upon the large scale map of this Society.

My work at Blantyre finished I had to think of returning to the coast. You have seen that my previous journeys had enabled me to lay open two new routes from the Shiré and South Nyassa to the coast; one terminating at Mozambique, the other at the rich trading settlement

of Angoche. Both these I saw were too long to be of much practical value to our settlers in the interior, at least until they had branched out further to the eastward. But the sudden trend taken by the coast-line to the westward, south of Angoche, seemed to place such ports as the Quizungu and Quillimane within easy distance overland from South Nyassa. We knew well that a trade route existed between the latter point and Quillimane. The village of a chief called Matapwiri on the north-east slopes of Milanji mountain, was a favourite rendezvous for parties from all parts of the country, and there the large caravans were organised, which, at regular periods, made their appearance at Quillimane. Apart, however, from the advantages which would accrue to trade, our troubles with the Makololo had shown us that a short overland route to the coast, which could be used as an alternative to the waterway of the Zambesi and Shiré, was absolutely necessary.

These then were the considerations which decided me to attempt the overland route from Blantyre to Quillimane. Quite lately you have had an account of that journey from one who accompanied me, and you have heard that it was successful. I will only add that great care was taken to make the route survey as accurate as possible, and about 800 observations have fixed the points of greatest interest on the road. Of the three routes to the Lake district traversed by me, this is undoubtedly the quickest and best, as Blantyre may be easily reached in fifteen days, and I can strongly recommend it to any one proceeding to the interior who desires to avoid the longer and more monotonous river journey.

I have now given you a brief sketch of all my journeys. If I have wearied let me ask you to remember it was not my own wish to speak of them. I am conscious that they have been sadly lacking in sensational incident. African travel, as far as I have experienced it, is rather a constant struggle against petty difficulties, lying guides, faithless carriers, extortionist chiefs, at times a dearth of food and water, with fever and ague, and other similar discomforts. These are the real difficulties of travel in such countries, and they are at times so trying and their monotony so intense, that I verily believe, the charge by a wounded elephant or buffalo bull—of which you generally hear much more—is hailed by most of us, when it comes, as a pleasing excitement and a welcome relief.

If I may lay claim to anything, it is only that by patient labour, careful inquiry, and faithful description, I have succeeded in rescuing from the realms of hearsay and imaginative geography, a great portion of that tract of Eastern Africa which lies between the Zambesi and Rovuma rivers, and by laying down its true physical features, I have driven out of the field a few of those elephants, with which—upon the authority of Swift—mappers are wont to bedeck the blank spaces of the earth.

But if poor in startling incident, I hope and believe the knowledge

we have gained of this country will be rich in useful and profitable result. My journeys have shown that instead of barbarous and savage tribes, you meet, in the Makua and Lomwe countries, with a people of peaceful and industrious disposition, and instead of depopulated or desert wastes, you have large tracts of cultivated country, as densely peopled as any parts of Africa. In many parts of this country, also, such as the Namuli Hills, healthy districts are reached at altitudes of between 3000 and 5000 feet, which provide a climate well adapted for European constitutions.

As from time to time I have described the mountain ranges and other principal features of this country, I will now only for a moment touch upon them. If we take a bird's-eye view of the whole Makua and Lomwe countries, we shall see one grand block of hills towering above all others and giving birth, from the innumerable streams that run off their precipitous sides, deeply scored valleys and broad lower slopes, to the largest rivers that discharge on the coast between the 11th and 18th parallels. These are the Namuli Hills. The most interesting point that the next traveller in this country can decide for us is whether the peaks of this range—which rise to an altitude of between 8000 and 9000 feet—are of volcanic formation. The range as far as I have climbed it, which is to a height of 5500 feet, showed no signs of this, and in no way differed in character from the other hill ranges of the country which are almost without exception granitic. The Namuli block of hills will well repay a careful examination not only from the wealth and variety of the flora the hill-sides present, but also from the fact that they form the home of the pure Lomwe, a decreasing race which I fear is being hunted off the surface of the earth by the neighbouring Makua and their own degenerate lowland brethren.

The frequency with which one encounters evidence of glacial action is another very interesting point to the traveller in this country. I have met with it upon the Namuli range, in the Inagu Hills and again much nearer the coast amongst a small block of hills called the Tugwi. You see it everywhere in the smooth dome-shaped tops and polished precipitous sides of the hills of the country, but the clearest evidence is afforded by the more striking spectacle of huge detached blocks lying across the summits of peaks, blocks many tons in weight, which could never have been carried there by any other known physical agency than that of ice. It has been remarked by a well-known African traveller, James Stewart, that this part of Africa "has never received its baptism or been regenerated by water," and to that he ascribes its barren character north of the Nyassa. But whether the continent has ever been submerged is yet a doubtful and disputable point; Professor Drummond, of Glasgow, believing that his discovery of certain shells in the road cuttings between Tanganyika and Nyassa, conclusively proves that it has.

This country will, I think, be of the greatest interest to you, from the fact that it immediately flanks a strong English colony which is in course of creation in the districts bordering the Nyassa and in the Shiré highlands. The strength of that colony, the progress it has made, and the magnitude of the interests bound up in it are, I think, but imperfectly understood at home. Perhaps this is partly due to the fact that the stirring events of late years have brought other parts of Africa more prominently before the public. The free discussion of the now defunct Congo Treaty, and the strength of the opposition to it, caused what little of English thought that could be spared from Egypt and the Cape, to be given to West Africa, and the Eastern Central districts have almost passed out of mind.

Therefore I will ask your permission to let me dwell for a few minutes upon our position in that country. Though the commencement of our occupation dates but a short time back, it has already become a real and permanent one. We have now four mission societies working in the field, and no less than thirteen mission and trading settlements upon it. The central station of the Scotch Established Church is the large and flourishing settlement of Blantyre, of the importance of which I have before spoken, and branches are radiating from it eastward into the country over which I have travelled. The Scotch Free Church have well occupied the western and southern shores of Lake Nyassa, and their substations stretch westward into the Mangoni highlands and northward, until they meet, midway between the Tanganyika and Nyassa, those of the London Church. The English Universities' Mission is now occupying the eastern shore of Lake Nyassa, and probably before long will have a connecting line of stations between the lake and the coast.

Trade, following close upon mission heels, has established steam communication upon the Zambesi and Shiré rivers, and upon the Nyassa; has founded a number of commercial settlements in the districts adjacent to these waterways, and bids fair soon to include the Tanganyika within the field of its operations. There are now five steamers upon the Shiré, Nyassa, and Tanganyika. Upon the Shiré highlands Scotch agriculturists are successfully raising sugar and coffee, and all the Lake missions are by their example encouraging the growth of useful products among the natives.

Where physical obstacles have been encountered, as at the Shiré rapids, roads have been constructed for waggon traffic, and tramways are now in contemplation. In order that you may better realise the work of this nature that has been done by the British settlers in the interior, I will mention one simple fact. When I visited Blantyre last year I found roads of better construction and greater length than are to be seen in the neighbourhood of Mozambique, which is, as you know, the capital of the Portuguese East African possessions.

In fact the first stage in the growth of a colony—a long one when

the settlers are solely dependent upon their own resources—has been got over at the chief of our Nyassa settlements quickly and well. Backed up by the assistance of home supporters, houses of brick and stone have been erected, some few with an upper story; and articles of comfort and luxury, not only those of necessity, are fast finding their way into the country.

Again, each mission station in the interior is the centre of a settlement of natives, who, harassed by marauding tribes and slave-dealers, have still a faith in the efficacy of British protection, and fly to its neighbourhood. Refugee slaves also, though English doors are now barred against them, crowd in numbers to the quieter and securer atmosphere of the surrounding, semi-attached villages.

The natives are being taught, without compulsion, habits of work; simply by placing within the reach of honest and moderate labour articles of European manufacture which they strongly desire. Habits of decency also and an improvement in moral tone follow the mission settlement; clothing becomes general, and many practices, of which the native may easily be made ashamed, fall into disuse. Where the missions are of an industrial nature, an artisan class is being formed from the most intelligent of the natives, rough indeed, but capable of handiwork which is of the greatest value in a rising settlement ill-supplied with skilled labour.

I say nothing of the higher and more lasting benefits conferred upon them by the Christian teaching of our missionaries, for this is neither the time nor place to dwell upon it.

These are some of the changes being wrought by, and good effects of the English peaceful invasion of Central Africa. I have only time to glance superficially over them; but I do not exaggerate when I say that English enterprise, working not only in mission, but also in other branches, is quickly altering the face of the country; has greatly improved the condition of the natives, and assisted, perhaps more than anything else, to check the slave trade in it.

There are so many, in England as well as in Scotland, who are strongly interested in the growth of this colony, that I feel I need make no apology for offering a suggestion by which I think its progress may be accelerated and English interests advanced in this portion of Eastern Africa.

First let me tell you that I have no wonderful plan to propose for the rapid development of the country. My scheme, if anything so simple and self-evident can be called a scheme, does not include a railway. Although we possess here, in the great line of the Central Lakes, and their eastern outlet, exceptional favourable natural features, I believe that the development of the country will only be attained through the expenditure of much labour, time, and money.

What I desire to point out is that we are running some risk of com-

mitting the same mistake with regard to the development of the interior that the Portuguese have committed with respect to the development of the coast, and if not courting the same failure, at least creating for ourselves greater difficulty than need be encountered. We are not, I think, sufficiently considering the geographical features of the country, or taking full advantage of the facilities nature has granted us in the plans by which we propose to open up the land.

Briefly, let me show you how the Portuguese have suffered by this neglect, and then we shall more clearly see the importance of avoiding a similar course. When the first Portuguese explorers arrived upon the East African coast their whole attention was given to the discovery of the best route to India, upon which, as an *El Dorado* of wealth, their hopes were centred. They cared nothing for developing the resources of Eastern Africa, and, with one exception—that of Sofala, which had the conquest of the gold country of Monomotapa in view—the points they occupied were simply looked upon as ports of call, or steps of the ladder they were constructing to India. Working then upon an unknown and often a hostile shore, an easy adaptability for defence became the first consideration, and they invariably selected islands, or, when compelled by want of these, to land upon the continent, they cut themselves off as much as possible, by a swamp or narrow isthmus.

The points then chosen they still occupy, although the condition of things has wholly changed, for now the opening up of the country, the encouragement of trade and the extension of their control over the people should be the first thought surely of the recognised rulers of the coast. Trade is handicapped by the establishment of custom houses upon islands distanced from the mainland; the power of Government is weakened by the removal of its centres to points difficult of access from the interior; and planters—private enterprise indeed in all its branches—are paralysed by the want of protection which this removal entails. Magnificent harbours and healthy points for settlement lie unutilised on every side, some, like Nakala in Fernão Veloso Bay, and the Quizungu, lying at the feet of rich and thickly-peopled districts to which they form, geographically speaking, the fit and proper outlets.

These are some of the causes to which the Portuguese failure in East Africa must, I think, be attributed, and, in my humble opinion, we are in one main respect in danger of repeating them. I want to lay stress upon the fact that there leads into the heart of Eastern Africa a splendid waterway, of which, if we are not wholly negligent, we are making at least a very poor use. You will more readily acknowledge what I say when I tell you that stations in the country south of the Zambesi and within 200 miles of that waterway obtain their supplies at enormous cost by land routes, which vary from 900 to 1400 miles, as they are counted from Durban, Port Elizabeth, and Cape Town respectively.

And we are advancing upon that waterway from the southward in greater numbers year by year.

But apart from the supply of outlying European stations, there is ample room for the expansion of commerce in the countries bordering upon the river. The Matabili, Mashona, and Manica countries, the two last of which, we are just beginning to learn, are the richest of all South African countries in gold, and, thanks to the hunting restrictions imposed by their powerful chiefs Lo Bengula and the late Umzeila, are still rich in ivory, should be tapped by means of this waterway. I can tell you that, owing to the primitive means of communication still in use, merchants at Tete, a point within 260 miles of the coast, claim, and have no difficulty in obtaining a profit of 150 per cent. upon their goods. And undeveloped as the trade is, no fewer than 300 boats and canoes leave Tete annually for the Upper Zambesi to barter again and exact infinitely higher profit upon the upper waters of the river. Ivory, indiarubber, oil-nuts, and gold are the articles of which this export trade consists. So you see that not only are the wants of the English colony springing up about the Nyassa to be supplied through this great gateway into East Central Africa, but it also forms the natural channel of supply for many of the mission, trading, and gold-mining centres, that English colonial enterprise is pushing further northward every year. It is also a ready and secure means of approach to countries traversed now only by the solitary hunter, but which, in centuries past, proved a rich field for the itinerant Portuguese trader and the wealth-loving Jesuit father. The Zambesi, after the coast belt is passed, divides a country, which some say, is destined ultimately to fall into English hands. Whether this is to be the case or not it will serve no useful purpose to inquire. But it will be well to bear in mind the importance of this river as the natural inlet of trade to this portion of Eastern Africa, and I believe that whoever gains a commercial supremacy upon it may well hope to govern the future of the people who dwell upon its banks.

As a waterway it is, I think, with all its faults, superior to the Niger; for though its navigation will always be broken at the Kebra-basa rapids, its waters will permit steamers, of light draught, to run upon it for nine and ten months in the year; whereas the Niger is navigable only for five. And upon the latter river we have an increasing trade, amounting even now to no less than 200,000*l.* sterling a year, and supplied through factories established at numerous points upon the river; whereas upon the Zambesi, from the Victoria Falls to Tete, a distance of over 800 miles, there is not a single commercial settlement. I would recommend then an increased use of this waterway, and, as a first step, an improvement in the steam communication upon the Lower Zambesi below Tete as well as upon the Shiré and Lake Nyassa. The outlay entailed by such an improvement may not only be made to repay itself, but, if well directed, will prove of incalculable benefit to the

country. The establishment of commercial agencies upon the river banks, will act as a spur to the industry of the natives; induce a more settled occupation of the country, and check the tendency an idle and impoverished people have to intertribal war and slave raiding.

It is impossible, when speaking of the natural resources and future development of this country, to pass over the evidence that is cropping up day by day of the existence in ancient times of a prosperous state or colony south of the Zambesi. Over a tract that stretches between the meridians of 27° and 34° east, and extends as far south as the 21st



RUINS AT ZIMBABWE.

parallel, ruins are being discovered which leave no doubt that this country was occupied in pre-historic times by a civilised people. I say in pre-historic times, for our earliest records of travel and trade upon the East African coast tell us nothing of it. And they go back in such works as the 'Periplus of the Erythrean Sea' to the beginning of the Christian era. Even if we suppose that Cape Prasum has been placed by the geographer Ptolemy too far down the coast when he gives it a latitude of $15^{\circ} 30' S.$, or that of Mozambique; it is certain that Greek, Egyptian, and Phœnician merchants in sailing twenty and twenty-five days before the north-east monsoon, must have reached points many

degrees south of the Line, and it is impossible to think that a colony of such extent and advancement could have existed in a state of complete isolation from the then known world. There are numerous indications



ANCIENT TOWER AT ZIMRAHYE.*

that the ancient colony did not consist merely of one or two cities, but that it included a large extent of country and formed a fair-sized state.

* Nothing strikes one more, on looking at this building, than its likeness to a modern "blast furnace," and the probability naturally arises that it was especially constructed to furnish fires giving out the greatest heat.

In considering the reasonableness of the conjecture that the cities in which these structures are found are of Phœnician origin, we may remember that furnaces were used by the Phœnicians in their expiatory sacrifices of human beings as well as of animals. Rawlinson, quoting from Gesenius and other authorities—who, he tells us, base their statements upon inscriptions found amongst the ruins of Phœnician cities—states that "human beings were consigned to a glowing furnace" in the Temple of El, or Saturn, at Carthage. Again, we know the "priests of Baal" revelled in "burnt offerings," and the shape of the altars they used is indicated to us in Jeremiah xix. 5: "They have *built* also the *high* places of Baal to burn their sons with fire for burnt offerings unto Baal." It is very curious that, in times comparatively recent, we find these furnace-like structures, in the ruined cities south of the Zambesi, used by the natives upon occasion of "solemn feast and sacrifice." May not tradition, in handing down their original use, have furnished them with a reason for this?—The two woodcuts here given are from illustrations in the posthumous work of T. Baines, entitled "Gold-Fields of South Africa."—[H. O'N.]

Our knowledge of the country is still far from perfect. From the records of Portuguese conquerors of the coast we learn nothing. It is only of late years, and from the travels of such men as Erskine, Mauch, Baines, Mohr, and Selous, that we have discovered the monumental evidence it contains. Ruins of cities have been discovered which have stood, if the difference in climate be considered, nearly as well as the most enduring monuments of Egypt and better perhaps than those of Assyria, the wear and tear of time. In the imperfect state of our knowledge of the country it is impossible to fix upon any particular mass of ruins, and say that it was the chief city of the ancient state. Carl Mauch has assumed that the extensive ruins discovered by him comparatively near the Sofala coast, in 20° S. latitude, are those of ancient Ophir, and he supposes this country to have formed a part of the realm of the Queen of Sheba. The ruins of Zimbabwe which he has brought to light are certainly of great extent, and most remarkable for the strange shapes they present as well as for their enduring structure. We feel at once satisfied they could only have been erected by a people far advanced in the arts of civilisation. Walls 12 feet thick at the base and tapering upwards to a height, even now, of 30 feet, constructed wholly of small hewn blocks of granite, put together without mortar, and in which are embedded blocks of stone 18 and 20 feet in length, apparently to support a gallery, sufficiently testify to the ingenuity and industry of their builders. North of these, about Manica, many ruins are also to be found, and no less than 350 miles west of these again masses of masonry are to be seen, like those I have described in solidity and singularity of shape.

No words need be wasted in refuting the statement of Erskine that these cities were the work of Francisco Barreto, the Portuguese "Conqueror of Monomotapa." Barreto never succeeded in penetrating the country, and the title by which he is generally known, of the "Conqueror of Monomotapa," was given him before he had even left the Tagus, when setting out upon his expedition.

You will naturally ask if any inscriptions have been found to enable us to call written testimony to our aid in deciding the race or nationality of the founders of these cities. None have yet been discovered, but in truth no search can be said to have been made for them. That they exist I am well assured. Just before leaving Mozambique, I had a long conversation with the only man who can tell us much of the ruins around Manica. Although a native of Portuguese India, he has lived forty years in the country, and having married a native chieftainess called the Queen of Barue, he is the chief authority in that part of the country. His own stronghold is upon the mountain of Gorongozo, which you will find marked upon most maps. He assures me that about Manica there are numerous inscriptions, and from his description of

them I am inclined to think they are in cuneiform or wedge-shaped characters.

I should have told you perhaps before, that all the ruins that have been met with in this country are surrounded with surface gold-mines, to such an extent, indeed, as to lead to the supposition that the chief industry of this ancient colony consisted in working for gold.

I need not remind you what important and interesting historical questions may perhaps be solved by a reading of these inscriptions. I do not know if I hazard a very bold suggestion when I say that these cities are probably of Phœnician origin, and that, at a period long anterior to the commencement of the Christian era, a colony of that nation existed in this country whose chief industry was gold-mining. The date of its foundation it is scarcely possible to surmise. But we may recollect that the colonising tendency of the Phœnician people received a great impulse shortly after the conquests of Joshua (1450 B.C.) diminished the extent of their mother country, and drove them to the Palestine seaboard. Or if we go back further still and remember that the first home of this race—as far as we yet know it—was upon the western shore of the Persian Gulf and that an extensive migration must have taken place thence previous to their arrival on the Mediterranean and settlement in the land of Canaan, it is surely not straining conjecture to assume that whilst a portion of them pushed up the Straits of Babelmandeb, overcoming every difficulty presented by that “gate of tears,” another portion of them chose the far easier passage offered by a favourable monsoon down the East African coast.

A belief that in pre-historic times the Phœnician nation was far more widely scattered than it has hitherto been supposed they were, appears to be daily gaining ground. Recent discovery has brought to light many traces of an ancient civilisation of the origin of which we know nothing. Inscriptions found at some of these, amongst which I may mention those brought home from Easter Island by Sir Thomas Brassey, will, it is hoped, throw some light upon this field of research. There are some, who have made the subject the study of a life-time, who believe that the ancient cities, ruins of which are met with upon the Pacific Islands, and also many of those in Beloochistan, Afghanistan, and other distant parts of the globe, are due to a wide-spread emigration of the Phœnician race. If they, through a satisfactory reading of the inscriptions found there, should prove their contention, then the suggestion I have thrown out respecting the cities south of the Zambesi is, I submit, strengthened; for it will have been conclusively shown that neither distance nor intervening breadth of ocean presented insurmountable obstacles to the colonising enterprise of the Phœnician people. And there may prove to be some truth in the writings of Sanchoniathon the Phœnician priest, who assigns to his people a

marvellous antiquity, and valuable information may yet be gathered from a work hitherto considered fabulous and discreditable.

But apart from any evidence which lately found inscriptions may present, is it not difficult to believe that a nation which at least 1200 years before Christ had founded colonies in every part of the Mediterranean Sea, had passed the Straits of Gibraltar and established themselves upon the western coast of Spain, whose ships traversed the northern seas, and penetrating southwards discovered the Canary Islands, and who shortly afterwards sent out fleets with thousands of emigrants—such as those which left Carthage under Hanno—to found colonies upon the West African coast; is it not difficult, I ask, to believe that a nation capable of such enterprises as these would be deterred by any difficulties of distance or navigation from venturing to low latitudes upon the East African coast?

It does not, however, come within the scope of this paper to discuss this subject here. I have only ventured to say so much to show that East Africa, in the very earliest times, appears to have formed a favourite field for colonial enterprise, and I desire also to awaken your interest in the archaeological treasures which, I am convinced, lie hidden there.

ASTRONOMICAL OBSERVATIONS BETWEEN THE MOZAMBIQUE COAST AND LAKE NYASSA,
TAKEN BY HENRY E. O'NEILL, F.R.A.S.

Places.	For Longitude by						For Latitude by		
	Sets of Lunar Distances.		Sets of Chronometer Sights.				Meridian Altitudes.		
	Body E.	Body W.	E. of Meridian.		W. of Meridian.		Body N.	Body S.	
1. Blautyre	☉ * 71 55	☉ * 131	☉ * 3 56	☉ * 21 14	☉ * 6	☉ * 2	* 8	* 7	
2. Ndima .. .. .	..	..	4	6	..	..	..	1	
3. Chipoka (S.W. Milanji Mt.)	..	..	3	11	..	2	..	1	
4. Chumbusa (Ruo R.)	12	12	3	5 3	2 1	1	1	1	
5. Machinjiri (S.E. Milanji Mt.)	..	..	7 4	5 5	2 1	1	1	1	
6. Luanza River .. .	..	..	4 3	3 3	1 1	1	1	1	
7. Malopa .. .. .	..	..	3	3	1 1	1	1	1	
8. Mpassu (Mlungusi R.)	12 3	5	6 9	11 9	1 1	1	1	1	
9. Chimbwa .. .. .	..	..	..	4 3	1 1	1	1	1	
10. Mriamwendo (Tetema R.)	..	..	2 3	3 6	1 1	1	1	1	
11. Chilemba .. .. .	..	..	3 5	8 4	1 1	1	2		
12. Msaui (confluence of Lukwali and Mlungusi R.)	..	..	7	6 7	1 1	1	1		
13. Lunani (Praso Buroro)	..	..	8	3 3	2	1	1		
14. Chemina vill. (Lake Amaramba)	14	27	4 9	5 6	1	2			
Carried forward ..	☉83 *84	175	☉54 *92	☉91 *66	☉9 *20	*22			

ASTRONOMICAL OBSERVATIONS—continued.

Places.	For Longitude by						For Latitude by		
	Sets of Lunar Distances.				Sets of Chronometer Sights.		Meridian Altitudes.		
	Body E.		Body W.		E. of Meridian.	W. of Meridian.	Body N.	Body S.	
	☉	*	☉	*	☉	*	☉	*	*
Brought forward ..	83	84		175	54	92	91	66	9 20 22
15. Chiuta Lake	3	..	..	1 ..
16. Mkanyea (E. Shirwa)	1 1
17. Masabango { N. ex- {	1 1
18. Kiromono { tremity {	2 1
19. Mikoko { Shirwa {	2 1
20. Chigwadu (Luasi Hill)	1 1
21. Makanyera (Mlusi R.)	3	..	3	..	..	..	..	1 1
22. Nangoma (Lukotokwa R.)	1 1
23. Nawaruma	25	..	20	..	9	..	8	2 2
24. Yano camp	13	..	17	3	4	3	..	2 ..
25. Ananihobe (Likugu R.)	1 1
26. Mwedederi (Namuli Hill)	7	3	2	9	7	5	5	.. 1
27. Egwoli (Inagu Hill)	6	..	9	3	3	3	..	4 4
28. Namlugu (Malema R.)	8	..	8	3	..	..	..	1 1
29. Napusa (Inagu Hill)	12	..	12	3	..	6	2	1 1
30. Najiwe	4	..	4	..	1 1
31. Namurola	7	..	9	6	..	17	..	1 1
32. Mkubure	3	13	..	2	..	6	..	1 2
33. Shalawe	5	..	..	..	2	..	5	..	1 1
34. Ngambo River	2	..	..	..	3	..	..	..	1 1
35. Tugwi	3	..	..	1	..	2	..	1 1
36. Nagulue	1	2	..	2 1
37. Mbadu	1	5	..	5	..	2 2
38. Namume	1	..	..	..	1 1
39. Umlaban Camp	2	..	..	..	1 1
40. Koeni	2	..	..	..	.. 1
41. Ngambo	1	..	..	..	1 1
42. Mangasanji (Manasomba Hill)	6	..	..	1	..
43. Mulira (Manasomba Hill)	1	..
44. Mlolo (Mongwe Hill)	6	..	..	1	..
45. Ntunda	4	..	5	..	1 1
46. Ruo River (Junction with Shiré)	1 3	7
47. Chironzi (Shiré R.)	5	..	5	..	1 1
48. Chiwangu do.	1	..
49. Morambala (S.W.)	3	..	3	..	1 ..
50. Shamo (Shiré R.)	1 1
51. Maruru (Zambesi R.)	13	..	4	..	1 ..
52. Mopea (Mutu R.)	4	..	..	..	1 ..
53. Menangene	2	..	..	..	1 ..
54. Chemsaka	2	..	4	..	1	..	1	..	2 1
55. Nangadi	1	..	1	2	..	6	..	2 2
56. Natiaka (L. Lidedi)	2	..	1	1	..	4	..	2 1
57. Lishehe	1	..	1	..	2 2
58. Mkopoka	1	3
Total sets of	☉92	*174	☉20	*258	☉152	*119	☉178	*81	☉17 *58 *71
Observations	266	..	278	..	271	..	259	..	75 71

ASTRONOMICAL OBSERVATIONS FOR MAGNETIC VARIATION.

Places.	By Altitude Azimuth.		By Time Azimuth.	
	E. of Merid.	W. of Merid.	E. of Merid.	W. of Merid.
Namūrola .. .. .	..	1	..	1
Najiwe	1	1	1	2
Napūsa	1	1	1	..
Egwoli	1	1	1	1
Mwedederi	1	1	1	1
Total ..	4	5	4	5

ASTRONOMICAL OBSERVATIONS FOR ABSOLUTE LONGITUDE.

Places.	By Moon's Altitudes.
Blantyre	55
Machinjiri	20
Msuva	21
Total	96

OBSERVATIONS FOR HEIGHTS ABOVE SEA-LEVEL BY BOILING-POINT THERMOMETERS
CHECKED BY ANEROID BAROMETER.

Places.	Heights above Sea-level.	Places.	Heights above Sea-level.
	feet.		feet.
1. Blantyre	3288	17. Ludia R.	1998
2. Ndima	3016	18. Mwedederi (Camp) ..	3046
3. Chipoka	1927	19. Mitini Hill, S. of Losi Valley.	5423
4. Chumbusa	1742	20. Yano Camp, Walaga River	2437
5. Machinjiri H. (Nalusu)	1706	21. Makanyera	2035
6. Luanza	1046	22. Mikoko (Shirwa). Mean of three observations for Lake Shirwa shows it to be	1946
7. Malopa	1247	23. Menangene	250
8. Mpassu, Mlungusi R.	1075	24. Chimsaka	474
9. „ Ridge near ..	1171	25. L. Nangadi	57
10. Chimbwa	652	26. Lishche	974
11. Mriamwendo	200		
12. Chilemba	20		
13. Napūsa Niheche R. ..	2337		
14. Natalea R.	3633		
15. Western Ridge	4763		
16. Namlugu Malema R. ..	2414		

GENERAL SUMMARY OF THE OBSERVATIONS TAKEN BY MR. O'NEILL.

Dates 1883 to 1884.	OBSERVATIONS.						Remarks.
	Lunars.	Time and Longitude.	Meridian Altitudes.	Lunar Altitudes for absolute Longitude.	For Variation of Compass.	Heights above Sea-level.	
Number computed	756	1590	146	63	54	84	Total number = 3850 single observations.
Number not computed	87	0	0	225	56	0	
Number observed	1632	1590	146	288	110	84	-

Remarks by John Coles, Esq., F.R.A.S., upon the Foregoing Observations.

As by far the greater portion of Mr. O'Neill's observations have passed through my hands, I am enabled to form an accurate estimate of their value. The lunar observations are extremely good, not only as regards the accuracy with which they have been taken, but also with reference to the choice made in the objects between which and the moon the distances were measured, so as to obtain distances of nearly the same arcual value, east and west; thus to a very considerable degree eliminating the effects of collimation error in the mean results. Time observations were frequently taken for rating the watches, a practice too little followed, and in many cases altogether neglected by travellers; but by paying close attention to this matter, Mr. O'Neill has obtained most satisfactory longitudes.

Speaking generally of these observations, it is not too much to say that no traveller in Africa has ever taken such an extended series of good observations, and were I asked advice on this subject by an intending traveller, I do not think I could do better than recommend him to closely follow the example set by Mr. O'Neill both in the number and class of observations.

The PRESIDENT, in introducing the author of the above paper, said that Mr. O'Neill's name had long been familiar to the members of the Society, some of the most interesting communications on South-eastern Africa having been those transmitted to the Society by him. He was sure they would be glad of the opportunity of meeting and welcoming one who had contributed so much to the extension of accurate geographical knowledge in that part of the world. Mr. O'Neill had been familiar with the country from the year 1871 to the year 1879 as an officer in the British Navy engaged on that coast, before he accepted the office of Consul at Mozambique. To that office he was appointed in 1879. From that time to the present a portion of every year had been devoted by him to journeys by land or sea, in order to obtain further knowledge of the country. As was well known, about 1000 miles of the coast had been claimed by Portugal. A great part of that coast was for all practical purposes first surveyed by Mr. O'Neill himself,

who discovered there, a little north of Mozambique, the harbour of Port Nakala, which was said to be one of the finest in the world. In subsequent journeys he made expeditions into the interior, the only knowledge of which was derived from slave-dealers, who had strong reasons for concealing the truth with regard to it. They represented a peaceful, quiet, well-regulated people as being given to internal wars, plunder, and to everything that could make travelling dangerous. No doubt the members recollected a very interesting paper by Mr. O'Neill, in which he showed that the natives were a kindly, friendly people, possessing a singular form of representative government. No great resolution was ever come to among them without hearing deputies from different villages, who assembled in a sort of rude parliament. It had been thought desirable that Mr. O'Neill should give a *résumé* of his various expeditions. He had just returned from Blantyre, but it was not so much for the purpose of describing his last journey, an account of which by his companion Mr. Rankine had already been read before the Society, as for the purpose of giving a general view of his travels, that he was present that night.

After the paper,

The Rev. HORACE WALLER said that Lieutenant O'Neill had set his mark upon the geography of East Africa in a way that hardly any other man had been able to. His work was of a high-class character, and the Geographical Society could not do too much honour to him, because he had raised the whole tone of African expeditions by his painstaking observations. He was evidently a worthy follower of Livingstone, who, with Sir John Kirk, first went to open up that country. It was impossible to overrate the importance of the vast water inlet to Africa which was formed by the rivers Zambesi and Shiré, and by Lake Nyassa, and it was gratifying to find that English and Scotch enterprise was at last taking the place of the lazy *régime* of the Portuguese. It was rather startling to find that the desiccation of water in Central Africa, which had been going on for many years, was now causing something like alarm at Lake Nyassa. It was easy to fancy that there was a sill where the Shiré flowed out of Lake Nyassa, and it was a matter of importance to have sufficient water in order to get into the lake from the river, but he believed that the fall of the water had been so very great that some alarm was now excited as to the possibility of passing out from the lake. It might, however, only be a question of dry and wet seasons. It was well known that in Lake Tanganyika there had been of late years an alteration in the level of the water, and it might be that the alteration in the level had solved the difficulties of those travellers who had tried to find an outlet to Tanganyika. It appeared that at certain times there was an outlet, at other times there was not, and he was afraid that a time would come when travellers to Lake Nyassa would say that there was no outlet from it. Lieutenant O'Neill had told him, to his great surprise, that persons could go on a tolerably good road from Quillimane to Blantyre in fifteen days. When first he (Mr. Waller) went into the country, he entered the mouth of the Zambesi with Dr. Livingstone on May the 1st, and reached a point at the foot of the mountain near which Blantyre stood in August, and yet he had a harder journey than Mr. O'Neill had. There would thus appear to be two strings to the bow, and one string they had to thank Mr. O'Neill for. The Portuguese, with an obstinacy of their own, seemed to have picked out the most unhealthy spots imaginable. It was remarkable to find Lieutenant O'Neill in 1885 using almost the identical words which Livingstone used when he first entered the country. Livingstone would not be content with stopping at any spot lower than 3000 feet above the level of the sea, and the first site he chose was within twenty miles of Blantyre. It only showed how the great sagacity of that extraordinary explorer had been fully

proved by those who had succeeded him. The longer he lived the more he was convinced that Livingstone was most careful in the observations he made, and the failures of many expeditions were undoubtedly to be traced to a disregard of the cautions which Livingstone laid down for travellers and missionaries. Exploration was alive all over Africa, but when the present excitement connected with the Congo discoveries, and annexations, and delimitations had subsided to some extent, he had no doubt they would go back to the words of Livingstone, and find that those who confined their exertions to lakes and rivers and the inseparable swamps would soon come to the end of their tether; whereas, on the other hand, those who would climb up to tablelands, and never be content to form settlements lower than 3000 or 4000 feet above the sea, would live to tell a different tale about Africa. It was the crass folly, the suicidal tendency of so many people in Africa, that had brought so many black marks against that continent. It was a magnificent country, and all those who had been in Eastern Africa felt the same infatuation for its beauty. Still it was not a country to be trifled with by Europeans. The first day a traveller entered Africa he was a better man than he was the second day, and the first year he was a better man than he was the second year. He did not at all believe in acclimatisation, but he believed in common sense, and when that was coupled with such indomitable courage and scientific accuracy as had been manifested by Lieutenant O'Neill, they might take heart of grace and thank God that such men had been raised up for African exploration.

Mr. CURT said that Lieutenant O'Neill had omitted to state in his paper, that two years ago when he was entitled to his furlough, he wrote to the Society saying that, if they would assist him with money, he would, instead of coming to England, devote his furlough to further explorations in Africa. The country shown on the map might be called O'Neill Land, for it had been visited by no other European. All previous great travellers followed a route more to the north, leading to the Lake Nyassa. Livingstone descended from Cape Delgado to the south of Nyassa in his last and fatal route, and the members of the Universities' Mission had done the same. Mr. O'Neill had had a double object—to extend geographical knowledge, and to oppose the slave trade. Along the coast from Ibo to Quillimane, that peculiar disease prevailed called "Portuguese blight." Though the Zambesi had been for 200 years in the occupation of Portugal, it was still without any of the appliances of modern civilisation, and the Portuguese had wished to treat the Congo in the same way; but Europe had proved too much for them. That country was the present home of the slave-traders, and he hoped that if Lieutenant O'Neill went back there he would do his best to put an end to them. It was only by opening up the country and making acquaintance with the tribes that they could put a stop to that dreadful curse of Africa. They must also try to prevent it coming to life again in a new form. From Ibo the French *engagé* system was beginning to spring up. Natives were brought down to Ibo, and put under nominal contracts, and transferred to French vessels. He hoped that Mr. O'Neill would have the means supplied him to make fresh expeditions into the interior, backwards and forwards from Mozambique and Ibo, until the geography of the country was thoroughly known, and slavery was entirely put a stop to.

Captain WHARTON said the strong point of Lieutenant O'Neill's journeys was the accuracy of his observations. There were a great many ways of travelling. A traveller might be a geologist, a botanist, or an ethnologist, but for the purpose of the Geographical Society it was most important that he should be a geographer, able to say where he had been. From the enormous amount of time that Mr. O'Neill had expended in astronomical observations there could be very little doubt as to where he had been, and his journeys would not be altered by any future travellers. It was a proud thing for him (Captain Wharton) as a sailor, to think that the know-

ledge Mr. O'Neill had acquired as a youngster at sea had been so very well utilised for the purposes of geography. Many members of the Society might hardly realise what it was to sit down after a long journey in Africa and take observations for three or four hours. It required no little zeal and a considerable amount of knowledge as well. To such travellers as Lieutenant O'Neill England owed a deep debt of gratitude, because journeys like his dealt the hardest blow at the slave trade. Mr. O'Neill had described the stories that were told about the country before he went there,—that the tribes were very bad and were always fighting amongst themselves, but those were merely slave-traders' stories told to keep honest white men out of the country. There was far more done by opening up the country than by keeping Her Majesty's ships cruising about up and down the coast. They all owed a great debt of gratitude to Mr. O'Neill for the energy he had shown during his Consulship.

The PRESIDENT, in proposing a vote of thanks to Mr. O'Neill for his interesting paper, said that he was sure the members would feel that the Council were thoroughly justified in choosing Mr. O'Neill as the recipient of one of the gold medals this year. Mr. O'Neill had been rather tied by the official tether, and had been prevented from taking as wide a flight as some other travellers in modern times. It would have been inconsistent with his official duties if he had attempted such a journey as that of Lieutenant Cameron across the continent, or of Mr. Thomson to Lake Tanganyika or to Victoria Nyanza. But within the limits in which he could work, he had done his work most thoroughly. Not the least pleasing part of what they had heard was the description of the friendly terms on which he, as well as Mr. Last, had lived with the natives they had come across. The more he (the President) had attended the meetings of the Society, the more he had become convinced that the character of the people as described by English travellers depended quite as much on the traveller himself as on the people. When the traveller wished them well, approached them skilfully, and had respect for their traditions and prejudices, he was well received; but when he carried with him too much John-Bullism, he very often rubbed them up the wrong way and was roughly received, and then came back and described them as a warlike and sanguinary race. As to the commercial importance of the country which Mr. O'Neill had explored, there could not be two opinions. He did not know whether Southern Africa was threatened with a great change in the supply of water, which would interfere with the river navigation, but one thing was quite clear, namely that river navigation, however convenient it might be, was always attended with danger from fever, whereas land journeys over country that soon became mountainous were generally healthy. Both from his sea journeys and his land journeys, Mr. O'Neill had acquired a right to speak on that subject because he had had little less than one hundred fevers at different times. They were all glad to see that he had escaped so many assaults of that deadly enemy to African travellers. He would soon be returning to Africa, and would no doubt find fresh fields for labour and exertion.

Mr. J. T. LAST read to the meeting the following remarks on East Africa. In introducing him,

The PRESIDENT said that the Cuthbert Peek grant, recently founded by the munificence of one of the members of the Council, had been awarded to Mr. Last for his explorations in Eastern Africa. The field of his explorations was not identical with that of Lieutenant O'Neill, being more to the north, but it would assist in giving a view of the steady advance of explorations in Eastern Africa if Mr. Last would give them some account of his journey in the country in which he had spent no less than eight years.

Mr. LAST addressed the meeting as follows :—It has been with great pleasure

and interest I have listened to the paper just read by Mr. O'Neill, on account of the several points of similarity between the countries and people he has visited and those around my station in East Africa; and knowing there is this similarity, I have ventured to write down a few notes bearing upon the districts which I have visited, hoping you would kindly allow me to read them to you. About eight years ago I had the honour to be sent out by the Church Missionary Society to their station at Mpwapwa, a district considerably to the north of where Mr. O'Neill has been travelling. After residing there for about two years, I removed thence to found a new station at Mamboia, a district some 50 miles nearer the coast. The station at Mamboia is in lat. $6^{\circ} 15' 30''$ S. and long. about 37° E. Here I resided till the end of last year. From both places I had frequent opportunities of making journeys into the neighbouring countries. These are Nguru to the north, Zeguha to the east, and Sagala to the south. These countries are without any ruling king or chief council, but are divided up into a number of small districts, each having an independent sultan, Zumbe or Mndewa, as he is called. These are all nominally under the Sultan of Zanzibar, and at some three or four places his Highness has soldiers, or else representatives to assert his authority. Practically, the chiefs and people of each district are independent, following their own laws and customs without reference to any outside power.

The country of Zeguha, which extends to within 20 miles of the East Coast, is generally flat or undulating. It is covered with thin forest, the trees of which are chiefly small, though some are large and well adapted for building purposes. Nearer the coast the country has a park-like appearance, having extensive spaces of short, smooth grass, with here and there large clumps of forest trees, all interlaced with countless creepers, and a thick brushwood underneath. In the middle of these clumps the Zeguha people build their villages, clearing away the centre and leaving the outer parts as a natural defence. The country of Zeguha, when compared with other districts, is not very fertile, though even here, in the little valleys, large crops of corn are raised which far exceed the wants of the natives.

Nguru and Sagala differ from Zeguha in being very mountainous and hilly. A chain of mountains extends through both the former districts and thence to Uhehe, in a north-east and south-west direction. This chain is disconnected in several places by extensive plains, which are dotted over with conical shaped or long sloping hills. The highest peaks in the chain are from 6000 to 7000 feet above sea-level, and are covered with magnificent timber trees, ferns, and undergrowth. Every here and there you find a native village, some on the very tops of the peaks, and close by are the fine gardens. The whole of the two districts of Nguru and Sagala is drained by the Wami, which takes its rise on the south side of the Itumba Hills. At the foot of the hills it is joined by a number of smaller rivers from either side, thence it flows on to Zeguha where it receives the Mkundi, Mvue, Mkindu, Rukagura, and other streams from the Nguru hills. The valleys and sides of the mountains, even to the tops, are very fertile. Here the natives produce Indian corn, two kinds of millet, beans, pumpkins, cassava, and bananas in abundance, far above what they can want for their own use. The sides of the mountains abound with springs of water, so that in times of drouht the natives have only to dig little trenches over their gardens, and turn the water on, then they are able to irrigate their plots of ground and produce almost as good a crop as if they had had the proper amount of rain. I have often seen the natives thus working in their gardens, especially last year when it was dry. European vegetables grow very rapidly and come to great perfection on the mountain and hill sides. During several years' residence in East Africa I have given particular attention to the cultivation of European vegetables. Kindly allow me to give you a few details of the result. The station at Mamboia is nearly

4000 feet above the sea-level, and here I have grown potatoes, turnips, beet, cabbages of several kinds, carrots, parsnips, onions, radishes, lettuces, and many other things, and they have been just as good as one could get in England. I was digging up potatoes one day and turned up an extraordinary root, and on counting them I found there were sixty-two potatoes, all told. The largest was about 5 inches long, and as big round as one's wrist. Amongst them about a dozen were too small for eating purposes. Of course this was an extraordinary root, but it shows what the land can do. Most common English flowers grow well, as geraniums, verbenas, petunias, zinnias, balsams, and others. There is a great variety of native flowers. The well-known favourite—"Impatiens Sultani," came from the Mamboia Hills. I have planted a number of fruit trees from the coast, such as mangoes, guavas, pomegranates, oranges, limes, custard apples, papaws, pineapples and others, which all thrive well. Besides these there are the native bananas of which there are some eighteen varieties, and sugar canes of three kinds. In many places it is highly probable English fruit trees would grow well, especially on the higher elevations; on the tops of the mountains, blackberries and wild raspberries grow freely. I removed some roots and planted them at the station at Mamboia, and there they grow, producing bunches of fruit as large and good as any seen at home. Besides being able to produce all these useful articles of food, I believe there are many places where such things as cinchona, coffee, tea, and vanilla might be grown to great advantage. In the extensive low valleys large quantities of Indian corn and rice are grown. The corn is used chiefly by the natives, the rice is sold either to passing caravans or taken to the coast. There is never any want of food amongst these hills; and under European care and guidance the present produce might be increased enormously.

In the midst of the fertile district of Sagala are the Itumba Hills, which are remarkable for ironworks. An account of the manner of working the pits will be found in my paper on "A Visit to the Wa-itumba Ironworkers."*

There are many magnificent sites where settlements could be formed, the land for which could be easily obtained from the sultan of the place at the cost of a little present in cloth, and often for nothing, as they are always glad to have a white man living with them. The climate is very healthy, especially in the hill districts. At Mamboia I was always glad to keep a fire during the evenings of the months from April to the end of July, because of the cold. The thermometer during these months at 6 o'clock in the morning is generally about 50° Fahr., and used to rise to 65° or 70° at midday. In the warmer months it rises to 90° sometimes on the verandah, and the nights are correspondingly warmer, but it is never so hot or close as to need a punkah. There is a short rainy season between November and December lasting about a month. Then it is warm and dry till the middle of March, from which time to the end of June is the heavy wet season, or masika. The masika rainfalls are heavy, but do not last continuously more than a day or two at a time. Frequently almost all through the masika the former part of the day is fine, and the afternoon wet, so that between the showers one can generally attend to whatever he has in hand.

The natives of these districts are closely allied in customs, language, and character. They are a part of the same great Bantu family of which Mr. O'Neill has been speaking. They are all agriculturists, keeping only a few cattle here and there. All the chiefs who can, keep a herd of goats and sheep, but these are more as a mark of wealth and position than for food. In character they are all alike, very cowardly, and would at all times rather flee to the woods and hide, than stand

* Proceedings R.G.S., 1883.

to fight with a strange foe. The Zeguha people are very noisy and boisterous when they have the advantage over a small foe, but in times of danger they have no more real go in them than the quieter Nguru and Sagala people. These latter are eminently a quiet and peace-loving people. I have lived amongst them for nearly eight years, and have always found them most friendly disposed towards me, and so they would be to any stranger who conducted himself peaceably towards them. The languages of the several tribes are all closely allied, being of the same construction, but differing in forms and words used. None of them are particularly difficult to learn after the Swahili or coast language has been acquired.

It has been reported that the Germans are about to make a railway from the coast up towards the Lake district, passing through Zeguha and Sagala. If so, we may hope to see this rich and beautiful country soon opened up, and many settlers making their homes on its lovely mountain slopes. Any well-disposed person may always be sure of a friendly reception from the peace-loving natives, and if he is honest and fair in his dealing with them, he will find them always ready to assist and respect him.

GEOGRAPHICAL NOTES.

New Expedition to Eastern Africa.—Mr. J. T. Last is about to proceed to Eastern Africa, under the auspices of our Society, to explore the district in the neighbourhood of the Namuli Peaks discovered by Mr. H. E. O'Neill. Mr. Last will land at Lindi and proceed thence to the junction of the Rovuma and Lujenda rivers, the position of which he will fix astronomically. He will spend six months in examining the neighbourhood of the Namuli Hills, making an accurate survey and studying its climate, its chief mineral, vegetable, and animal products, commercial resources, and the condition of the native tribes, returning to the coast by way of the populous valley of the Likugu.

Letter from Rev. G. Grenfell on his Ascent of the Congo and its Tributaries.—We have just received the following letter from the Rev. George Grenfell, giving additional particulars regarding his voyage up the Congo in the Baptist missionary steamer *Peace*:—"The Lefini river is only navigable for two or three miles, when it becomes a torrent. The Nkenye or Nkië is a small tortuous stream falling into the Congo near the second parallel of south latitude. It has a mean width of 60 yards, depth of 12 feet, and current of 220 to 250 feet per minute. After 70 miles of steaming we only found ourselves some 25 miles N.N.E. of its confluence. The Mobangi, which falls into the Congo, forming a delta extending between 26' and 42' S. lat., is one of its largest tributaries. Following a mean course of north by east, I left it at 4° 30' N. still an open water-way. At 4° 23' N., just below the second rapids, I found it 673 yards wide; at no point lower down was it less in width. Mean depth 25 feet, and although the current was not more than 80 to 100 feet per minute, it means an immense volume of water to find running south at a point so near the supposed sources of the

Benue. Where does it all come from? The 'trumbashes' of the Chad basin (Schweinfurth) are common, while they are not known on the Congo. On the river which corresponds to Stanley's Ukere, and which I ascended as far as the cataract in $2^{\circ} 50' N.$, I found shields and scimitars, as well as the 'trumbash' corresponding exactly with Schweinfurth's drawings. I found the width just below the cataract 240 yards; lower down a little narrower, with a mean depth of 12 to 15 feet and current of about 150 feet per minute. Within a few miles of the Congo the Mbura resolves itself into two streams, each of which is barred by a cataract some six or eight miles further on.—Returning from Stanley Falls, we ascended the Lubilash as far as $1^{\circ} 33' S.$ It ranges from 200 down to 60 yards in width, is very tortuous, and has a terribly strong current; several times we could find nothing less than a five-mile current in which to anchor. Mean course S.S.E. I found no other stream worth mentioning till we reached the Bokumbi, in $1^{\circ} 35' N.$, 50 yards wide, 9 feet deep, and 100 feet current per minute. The next is that important affluent which joins the Congo at $44' N.$, the Lulongo. The Ikelemba and Boruki debouch at $10'$ and $8' N.$ respectively; the latter is one of the principal feeders of the main stream, the former is only navigable for about one degree E.N.E.; it is very tortuous; at a point 80 yards wide it has a mean depth of 19 feet and current of barely 60 feet per minute. The most northerly point in the Congo bend I found to be $2^{\circ} 11'$, near the mouth of the Ukere, Loïka, Dujangi, Yarigimba, or whatever its name may be.—It is only just that I should express my indebtedness to the International African Association and those wondrous efforts in which the King of the Belgians is the prime mover, for the work they have accomplished on the Congo, which has rendered it possible for missionaries to ascend its stream and make their way along its affluents. Promising you more details, including boiling-point observations, azimuths, &c., when I have a little more time to spare—Yours, &c., G. GRENFELL."

The Sources of the Congo explored.—We received on the 26th of June a telegram from Senhor Cordeiro, Secretary of the Geographical Society of Lisbon, informing us that the well-known Portuguese explorers, Messrs. Capello and Ivens, have crossed Africa on their second great journey of exploration, and have traced the upper waters of the Congo, from the Lualaba to the Luapula and Chambeze.

The Bechuanaland Protectorate.—On January 27th, 1885, at a Court held at Osborne by Her Majesty, it was decided to establish a Protectorate over Bechuanaland; the announcement was made in the 'Gazette' of January 30th. The accompanying map shows the boundaries of the new Protectorate, which are defined as follows in the Order:—"The parts of South Africa situate west of the boundary of the South African Republic as defined by the Convention made at London on the 27th day

of February 1884, between Her Majesty and the said Republic; north of the Colony of the Cape of Good Hope; east of the 20th meridian of east longitude; and south of the 22nd parallel of south latitude; and not within the jurisdiction of any civilised power." In an interesting communication to the *Times* of June 12th, from a correspondent writing from Sechele's Town, the area of the Protectorate is stated to be as large as that of Spain. It includes much more than Bechuanaland proper, taking in the Kalahari desert; while the southern and eastern portions are fairly well known from the accounts of Livingstone and



succeeding travellers, the western and northern section still remains to be thoroughly explored. There seems to be some uncertainty as to how far eastwards the northern boundary (22° S. lat.) extends. The Cape authorities carry it nearly as far as the 32nd degree, claiming the strip of land between the Limpopo river and that parallel, and so shutting in the Transvaal on the north, as it is on all other sides.

The Niger Protectorate.—A still more recent protectorate is that which has been established over a considerable area of the Niger region. It is notified as follows in the 'Gazette' of June 5th:—"It is hereby notified for public information, that under and by virtue of certain

treaties concluded between the month of July last and the present date, and by other lawful means, the territories on the West Coast of Africa, hereinafter referred to as the Niger Districts, were placed under the Protectorate of Her Majesty the Queen from the date of the said treaties respectively. The British Protectorate of the Niger Districts comprises the territories on the line of coast between the British Protectorate of Lagos and the right or western river-bank of the mouth of the Rio del Rey. It further comprises the territories on both banks of the Niger, from its confluence with the river Benue at Lokoja, to the sea, as well as the territories on both banks of the river Benue from the confluence, up to and including Ibi." It will thus be seen that the whole of the Niger mouths are now under British protection, and that in the south the British possessions march with those of Germany. Ibi is about 230 miles up the Benue from its confluence with the Niger. The following agreement which has been come to between Great Britain and Germany, will explain more precisely the relations of the two countries on the west coast of Africa :—"Great Britain engages not to make acquisitions of territory, accept Protectorates, or interfere with the extension of German influences in that part of the coast of the Gulf of Guinea, or in the interior districts to the east of the following line—that is, on the coast, the right river bank of the Rio del Rey entering the sea between $8^{\circ} 42'$ and $8^{\circ} 46'$ longitude east of Greenwich; in the interior a line following the right river bank of the Rio del Rey from the said mouth to its source, then striking direct to the left river bank of the Old Calabar or Cross river, and terminating after crossing that river at the point about $9^{\circ} 8'$ of longitude east of Greenwich, marked 'Rapids' on the English Admiralty Chart. Germany engages not to make acquisitions, accept Protectorates, or interfere with the extension of British influence in that part of the coast of the Gulf of Guinea lying between the right river bank of the mouth of the Rio del Rey, as above described, and the British colony of Lagos; nor in the interior to the west of the line traced in the preceding paragraph. Both Powers agree to withdraw any Protectorates already established within the limits thus assigned to the other, a reservation being specially made as to the settlement of Victoria, Ambas Bay, which will continue to be a British possession. Germany engages to withdraw her protest against the hoisting of the British flag at Santa Lucia Bay, and to refrain from making acquisitions of territory or establishing Protectorates on the coast between the colony of Natal and Delagoa Bay."

Dr. von Hardegger's and Prof. Paulitschke's Expedition into Somal Land.—We learn from Prof. Paulitschke that the expedition in which he joined Dr. von Hardegger has terminated successfully. Having succeeded after a considerable amount of trouble in organising their caravan, the travellers left Zeila for the interior, and arrived at Harar on February 15th. They resided there for three weeks, a sojourn which enabled

Prof. Paulitschke to determine the longitude of the town in a thoroughly satisfactory manner. Having visited the lakes of Haramāya and Adèle, to the west of Harar, and finding it impossible, owing to war, to go on to Shoa, the Austrian explorers turned their faces to the southward. By way of Argóbba they proceeded to Bebássa, where they established their quarters for some time. They then ventured to push on in the direction of Ible and as far as the ruined city of Bía Worába, on the boundary of the territory of the Annia Galla. Nothing could be learnt as to the existence of lakes to the south of Harar. Abundant springs were numerous, but the only basin or lake of water known to either Somal or Galla was stated to be in Ogadén, to the south-east of the Melengár tribe. It is called Gaábarta. Bía Worába is the place marked "Stone ruins" on the Society's map. Whilst at Bebássa the travellers heard from Mr. James and his companions, then travelling to the northward far to the east.—The scientific results of the expedition appear to be thoroughly satisfactory. The positions of Saldêsa, Harar, and Beldassa have been determined with much care, the route was mapped, the altitudes were determined with the aid of four aneroids and by boiling-point observations. Dr. Paulitschke has also taken about 150 large photographs of Galla and Somal, whilst scientific collections of all kinds (including manuscripts) have been made and presented to various scientific institutions at Vienna.—Prof. Paulitschke speaks most highly of the kindness shown them by Major J. Hunter, Captain Stuart King, Major Heath, and Lieutenant Peyton. He has left sets of meteorological instruments at Harar and Zeila, and the British officers stationed there have promised to read them regularly. Already meteorological journals, in perfect order, and up to the end of April, have reached Dr. Paulitschke.—The Austrian explorers travelled by a route lying to the west of that of Messrs. James, and as they collected also much native information, their contribution to the cartography of Somal and Galla Land promises to be valuable, even though their routes have not been very extensive.

Mr. E. H. Richards's Journey in East Africa, West of Inhambane.—Mr. Richards, of the American East Central African Mission, states in a letter recently received, that, on further inquiry, he is convinced that the stream which he reached on his late journey inland,* which the natives assured him was the Limpopo, was not that river but a branch of it, the Luizi, which runs parallel with the main river for a long distance and many miles to the eastward.

Jeddah and Hodeidah.—In the Austrian 'Monatschrift für den Orient' for June 15, will be found an account of a recent visit to these two Arabian seaports, by Herr C. Kablenberg, which contains a good many details as to the actual condition of these towns, their population and industries. The population of Jeddah he gives at about 20,000

* See 'Proceedings,' June, p. 381.

Mahomedans, and the value of trade (imports and exports) at 800,000*l.* annually.

Population of Persia.—In a Report by Mr. Dickson on Persia, in 'Reports of Her Majesty's Secretary of Embassy and Legation,' part i., 1885, are some statistics on the population of Persia, mainly from estimates by Mr. Schindler, a German in the service of the Shah, who has travelled over most of the country, and who has taken great pains to ascertain its condition and resources. He estimates the area at 1,647,970 square kilometres, and the population as follows: 99 towns with 363,630 families, or 1,963,800 souls; villages or districts without towns, containing 3,780,000 souls; Nomads—Arabs, 52,020 families; Turks, 144,000 families; Kurds and Leks, 135,000 families; Beluchs and gipsies, 4140 families; Bakhtiari and Lurs, 46,800 families, or 1,909,800 nomads in all. The total population of Persia would thus be 7,653,600 souls. The following is a list Mr. Schindler has made of some Persian towns with their respective populations:—Tabriz, 164,630; Ispahan, 60,000 to 70,000; Yezd, 40,000; Kerman, 41,170; Shiraz, 30,000; Shuster, under 20,000; Dizful, 25,000; Burujird, 20,000; Kermanshah, 30,000; Hamadan, 30,000; Maragha, 13,250; Soujboulak, 5000; Zenjan, 24,000; Kazvin, 40,000; Resht (with adjoining villages), 40,000; Astrabad, 10,000; Nishapore, 11,000; Sebzevar, 12,000; Meshed, 60,000; Kashan, 30,000; Kum, 20,000; Mianeh, 7000; Mohammera, 15,000. Mr. Dickson estimates the population of Tehran at 120,000, and Colonel Ross that of Bushire at 10,000.

Corea.—In the Proc. R.G.S. for 1884, p. 287, will be found an account of a journey made by Mr. Carles, in November 1883, into the interior of Corea from Shanghai. Another and more extensive journey was made by Mr. Carles between September 27th and November 8th of last year. Setting out from Söul, he went in a north-westerly direction by Rha-ju and Phyong-san to Hwang-ju; north by Phyong-yang to An-ju; westward to Chung-ju and Chol-san, and on to Wi-ju, on the estuary of the Am-nok-gang or Yalu, the river forming the frontier between Corea and Russia. Mr. Carles followed up the left bank of the river Wi-win, when he turned east to Kang-ge, and north to Chang-jin on the Samsu river close to the northern frontier. He then travelled southward across country and came out on the west coast at Gen-san, and thence southward to his starting-point, Söul. Nearly all the places mentioned by Mr. Carles will be found on the Japanese map edited by Mr. Satow, and published by Perthes of Gotha. Hitherto, however, these places have been mere names, and the details which Mr. Carles gives will give them reality. He has many notes on the aspect of the country passed through, the nature of its industries, prospects of trade, population of towns, &c. All the towns touched he has tabulated in an itinerary, with an estimate of the number of houses in each case. At Phyong-san, in

Hwang-Hai-Do, the scenery becomes wild and mountainous. In fact, the whole of Northern Corea is of a mountainous character, a central range forming the backbone of the country, and sending out spurs east and west. Twenty-three miles east of Kang-ge Mr. Carles reached the edge of a forest, which extended to the summit of the mountains, 6000 feet high, that form the left line of the valley of the Sam-su river. From a pass in this district a peak of 6000 to 7000 feet was visible, and a high range, probably the Paik-san, was seen lying to the south. Here the country was very sparsely peopled. The whole of the valleys from the foot of the A-te-kai Pass to the junction of the Chong-jin and Sam-su rivers, and up to the head of the latter river, lie at an elevation of 3000 to 4500 feet above the sea. Northern Corea seems indeed to be a high plateau, sending up ranges and peaks to a height of something like 7000 feet. Of the Yalu, which forms the north-west frontier between Corea and China, Mr. Carles says that its volume shows little diminution as its course is ascended. Near Chhu-san, for example, about 100 miles from its mouth, it is still over a quarter of a mile wide. Mr. Carles noticed a marked difference between the two countries on the opposite banks of the Yalu. Though not a decade has passed since the occupation by the Chinese of the northern bank, the houses on that side of the river are far more substantially built than those on the Korean shore; temples are planted on the well-wooded hills, and numerous small craft lie at anchor off the towns, whose walls appear to be in good repair. This prosperity Mr. Carles attributes entirely to the richness of the soil on the north side as contrasted with its sterility on the Korean side.

British and German Partition of New Guinea.—The following arrangement has been agreed upon between the Governments of Great Britain and Germany as to the boundaries of the possessions of the two countries in New Guinea:—The point on the north-east coast of New Guinea where the 8th parallel of south latitude cuts the coast forms the boundary on the coast, and a line described as under determines the boundaries inland of the respective territories. Starting from the coast in the neighbourhood of Mitre Rock on the 8th parallel of south latitude, and following this parallel to the point where it is cut by the 147th degree of east longitude, then in a straight line in a north-westerly direction to the point where the 6th parallel of south latitude cuts the 144th degree of east longitude, and continuing in a W.N.W. direction to the point of intersection of the 5th parallel of south latitude and of the 141st degree of east longitude. The British possessions lie to the south of the line thus defined, the German to the north. The British possessions will not include Long Island, or Rook Island, or any islands adjacent to New Guinea to the northward of the 8th parallel of south latitude. Thus nearly the whole of the south-east peninsula is retained under British protection. The New Guinea Company of Berlin is preparing to send out, in the course of the

present year, scientific expeditions to Kaiser Wilhelm's Land and the Bismarck Archipelago, the latter being the new name given to New Britain. According to Friederichsen's new map of the Western Pacific, constructed to show the region included in the administration of the New Guinea Company, all the islands south of the Equator and between 141° and 154° E. long. are now under German protection. According to this map the area of the German Protectorate on the mainland of New Guinea is 68,785 English square miles; of the English Protectorate, 86,360 square miles; and of Dutch New Guinea, 150,755 square miles. The total area of New Guinea would thus be 305,900 square miles.

Population of Melbourne.—According to official statistics the population of Melbourne and suburbs at the end of 1884 was 322,690, as compared with 304,409 at the end of 1883 and 240,932 at the end of 1874.

Population of Hawaii.—From the Census of the Hawaiian Islands, taken in 1884, the results of which are just issued, we note that the population is as follows:—Oahu, 28,068; Hawaii, 24,991; Maui, 15,970; Kauai and Niihau, 8935; Molokai and Lanai, 2614; total, 80,578. This shows a total increase since 1878 of 23,774. The native population has decreased by 3905, while the foreign population has increased by 25,869.

Queen Charlotte Islands.—By order of the Government of British Columbia, Mr. Newton H. Chittenden undertook an exploration of Queen Charlotte Islands in the summer and autumn of 1884. The Official Report issued at Victoria contains a valuable preliminary account of the islands and their inhabitants. On the latter especially the details are very full. The four Progress Reports from Mr. Chittenden give the results of his observations on Hyda Island, Moresby, Graham, and Provost Islands, their physical features, resources, and inhabitants. These last, Hyda Indians, number about 800 souls, living in the villages of Masselt and Skidegate in Graham Island, Gold Harbour in Maud Island, in Skidegate Inlet; Cumshewa, in Moresby Island; Skedance, in Lyell Island; Tanoo, or Laskeek, in Tanoo Island; and at Ninistints, on a little island opposite the west coast entrance to Houston Stewart Channel. Mr. Chittenden is inclined to ascribe the origin of the islanders to Eastern Asia, they differ so markedly in physique, language, and intellect from the other North Coast Indians.

Hudson's Bay.—We have already referred to the expedition sent by the Canadian Government to investigate the navigability of Hudson's Bay and Straits, with a view to establish a new trade route. The report of the commander of the expedition, Lieutenant A. R. Gordon, R.N., is now to hand, and contains full details of the operations undertaken in the summer of last year. Meteorological stations were established at numerous points in the Straits, on the islands at their inner end, and at

York Factory and Fort Churchill on the west coast. These stations were to be at work for a year on a carefully prepared programme, and the results in all departments of meteorology, as well as with reference to ice-movements, will doubtless be of much importance. Lieutenant Gordon gives some interesting notes on the ice he observed while cruising in the *Neptune* in the Straits and Bay during July–September 1884. The terror of the ice, he says, disappears on investigation. The ice met with on the cruise of the *Neptune* may be divided into three classes, having distinctly separate origins. They are—icebergs, from the glaciers in Fox Channel; heavy Arctic field-ice from the Channel itself; and what may be called ordinary field-ice, being that which had been formed on the shores of the Bay and Straits. No icebergs were met in Hudson's Bay, nor did Lieutenant Gordon hear of any being seen there. In the Straits a good many were seen, principally along the north shore. Some of them in the east end of the Straits had come in from Davis Straits, while all of those met in the westward had come from Fox Channel, as observations made by Mr. Ashe at North Bluff show that an iceberg coming in sight from the westward will pass out of view to the eastward in from three to four tides, showing an easterly set of upwards of ten miles a day. The icebergs in Hudson's Straits in August and September, according to Lieutenant Gordon, would form no greater barrier to navigation than do those met with off the Straits of Belle Isle. The ordinary field-ice was met with off North Bluff and the Upper Savages, to the west end of the Straits, on August 11th. No obstruction to the cruise of the ship was met with from the ice, though the Eskimo declared it was unusually abundant last year. As to the heavy Arctic ice, after passing the east end of Salisbury Island it got heavier and closer, and when off Nottingham Island Lieutenant Gordon was compelled to head more to the southward. The sea in every direction was one vast field of ice. Some of it was 40 feet thick—solid blue ice—"which had evidently been frozen just as we saw it." The general average thickness was 15 feet. Lieutenant Gordon does not consider it possible for ice to form in Fox Channel to a greater thickness than 10 feet in a single year, and is convinced that much of the ice which the *Neptune* encountered was the accumulation of several years. To throw light on the point, measurements of the formation of ice were to be made at several of the stations. Only occasionally, Lieutenant Gordon believes, does this heavy Fox Channel ice appear in Hudson's Straits. No difficulty was found in navigating the ship south of Dudley Digges Island, round by Mansfield and Southampton Islands, north-west to Chesterfield Inlet, south to Fort Churchill and York Factory, and back again right across the Bay. The report contains useful sections on the resources of the region, its trade, natural history, &c. Dr. Robert Bell's report on the geology forms a valuable appendix. The expedition which left at the end of May last will, after visiting the various stations at

which observation parties were stationed during the past winter, and landing fresh parties to relieve those whom they take off, make further surveys in the vicinity of the stations, take magnetic observations, and all the information possible will be obtained regarding the resources of this unknown land. Beacons are to be erected where practicable on prominent points of danger, and all harbours in Hudson Bay will be examined and surveyed.

The Forests of Canada.—In an Official Report on the Forests of Canada, some statistics are given of the extent of the Dominion still under wood. There has been of course great destruction in the "primeval forest," partly through forest fires, and partly through reckless cutting down. Both in Canada and the United States the Governments are now looking more carefully after their timber; and in most of the Canadian provinces licences are required for cutting it down. A rough estimate gives the total area of timber lands in Canada at 280,000 square miles. In Ontario the timber area is estimated at 38,000 square miles; Quebec, 92,000 square miles; New Brunswick, 12,500 square miles; Nova Scotia, about 3000 square miles. In Prince Edward's Island there are now no forests of any extent. No estimate is given for Manitoba, nor for the North-western Territories, where considerable areas in the Rocky Mountains are under forest. According to a Report of Dr. Robert Bell, Assistant-Director of the Geological Survey of Canada, the forest trees east of the Rocky Mountains may be divided into four groups, as regards their geographical distribution within the Dominion: 1. A northern group, including the white and black spruces, larch, Banksian pine, balsam fir, aspen, balsam poplar, canoe birch, willow, and alder. These cover the vast territory down to the line of the white pine. 2. A central group of about forty species, occupying the belt of country from the white pine line to that of the button-wood. 3. A southern group, embracing the button-wood, black walnut, the hickories, chestnut, tulip tree, prickly ash, sour gum, sassafras and flowering dog-wood, which are found only in a small area in the southern part of Ontario. 4. A western group, consisting of the ash-leaved maple, bur-oak, cotton wood, and green ash, which are scattered sparingly over the prairie and wooded regions west of Red River and Lake Winnipeg.

Population of Guatemala.—The official statistics of Guatemala give the population of that State for January 1st, 1885, as 1,284,604, as against 1,278,331 at the corresponding date last year.

Exploration in Guiana.—Dr. Ten Kate, the eminent Dutch traveller, has left for South America, with the intention of ascending the Surinam river, in order to cross the Tumuc-Humac chain, and reach Brazil by one of the affluents of the Amazon. It will be remembered that this is the region traversed by the late Dr. Crevaux.

Edrisi's Geography of Spain.—It may be interesting to historical geographers to know that a series of papers on Edrisi's Geography of Spain is appearing in the *Boletín* of the Madrid Geographical Society.

Relief Maps.—The 'Bulletin' of the Hungarian Geographical Society (tome xiii. fasc. iv.) speaks in approving terms of a new method of constructing relief maps, which is a great advance on the methods hitherto in use. The method is the invention of Lieut. Guttenbrunner, and its peculiarity consists in the employment of caoutchouc instead of plaster. A section of the Schneeberg has thus been reproduced on the basis of the Austrian Staff maps, and according to the 'Bulletin,' this specimen is nearly all that could be desired. In precision, solidity, and cheapness, Lieut. Guttenbrunner's material much excels plaster.

Elementary Geographical Education.—We are glad to see that the Education Department realises the necessity for still further improvements in geographical education in elementary schools. In the Revised Instructions issued to Her Majesty's Inspectors, the necessity of something more realistic than names is insisted on. "Geographical teaching," the Instructions state, "is sometimes too much restricted to the pointing out of places on a map, and to the enumeration of such details as the names of rivers, towns, capes, and political divisions. It is hardly necessary to say that geography, if taught to good purpose, includes also a description of the physical aspects of the countries, and seeks to establish some associations between the names of places and those historical, social, or industrial facts which alone make the names of places worth remembering. It is especially desirable in your examination of the Fourth and higher Standards, that attention should be called to the English Colonies and their productions, government, and resources, and to those climatic and other conditions which render our distant possessions suitable fields for emigration, and for honourable enterprise. In order that the conditions laid down for the geographical teaching of the lower classes may be fulfilled, good maps, both of the county and of the parish or immediate neighbourhood in which the school is situated, should be affixed to the walls, and the exact distances of a few near and familiar places should be known. It is useful to mark on the floor of the schoolroom the meridian line, in order that the points of the compass should be known in relation to the school itself, as well as on a map." If the programme is insisted on year after year, no doubt our elementary schools will in time approach the standard of those of Germany.

Obituary.

Dr. Gustav Nachtigal, one of our Medallists, and one of the most notable of recent African explorers, died of fever on board the German gunboat *Möwe*, on April 20th, off the West Coast of Africa. Gustav Nachtigal was born in February 1834, at Eichstedt, a little village near Stendal, in the Prussian district of Magdeburg. Nachtigal studied medicine at Halle, Würzburg, and Greifswald, but weakness of the chest compelled him in 1862 to seek a warmer climate than Germany. After a short residence in Algeria, Nachtigal went on to Tunis, where having established his reputation as a physician, he devoted himself to a study of the archæology of the country. In 1868, through the intervention of Dr. Rohlf's, he was selected by the King of Prussia to undertake an embassy to Sheik Omar, Sultan of Bornu. Nachtigal left Tripoli in February 1869 for Murzuk. From Murzuk he made a lengthened excursion into the Tibesti country. Starting south again in April 1870, Nachtigal reached Kuka, the capital of Bornu, on the west shore of Lake Chad, on July 6th. From this centre he made excursions in all directions, south into Baghirmi, and round Lake Chad to Kanem. In March 1873, Nachtigal turned eastwards and by Wadai, Darfur, and Kordofan, he reached Cairo on November 22nd, 1874. The rich results of this six years' journey through one of the least known and most interesting regions in Africa—results in all departments of geographical knowledge, topography, natural history, ethnology—were published in 1879–81, in two volumes, 'Sahara und Sudan.' Nachtigal's health suffered greatly owing to these arduous years, and before his return to Europe he had to stay a year in Egypt to recruit. Honours were deservedly showered upon him. The Paris Geographical Society awarded him its great gold medal, and in his absence he was elected President of the Berlin Geographical Society, a position which he held until 1882, when he was appointed by Prince Bismarck German Consul-General at Tunis. In 1882 the Royal Geographical Society awarded Nachtigal its Founder's Medal. As is well known, he was appointed in 1884 to take an active part in the colonial enterprises of Germany on the African West Coast, and it was while thus engaged that he succumbed to fever. Nachtigal was a type of the best class of scientific travellers and geographers. He was well qualified by scientific training for his work to start with, was a patient and accurate observer, and was content to remain hidden in Africa for years until he was able to bring home a tribute which would mark him out as one of the greatest servants of science.

THE ANNIVERSARY MEETING, JUNE 8TH, 1885.

The Right Hon. Lord ABERDARE, President, in the Chair.

ELECTIONS.—*Hastings Charles Dent, Esq.; George Andrew Jones, Esq.; Robert B. Leslie, Esq.*

The proceedings commenced at half past two P.M., with the reading, by Mr. C. R. MARKHAM, Secretary, of the Regulations which govern the Anniversary Meetings of the Society.

After this the PRESIDENT nominated, as Scrutineers of the Ballot about to take place, Admiral Sir ERASMUS OMMANNEY and Mr. HORMUZD RASSAM.

Mr. MARKHAM then read the Report of the Council as follows:—

REPORT OF THE COUNCIL.

The Council have the pleasure of submitting to the Fellows the following Report on the financial and general condition of the Society:—

Members.—The number of Fellows elected during the year (ending April 30th, 1885) was 190, besides three Honorary Corresponding Members. In the previous year, 1883–84, the total elections amounted to 183, and in 1882–83 the number was 163. Our losses have been, by death 79 (besides four Honorary Corresponding Members), by resignation 74, and by removal on account of arrears of subscription 24; making the net increase for the year 13. In the year 1883–84 there was a decrease of 14; in 1882–83 an increase of 37. The total number of Fellows on the list (exclusive of Honorary Members) on the 1st of May was 3393.

Finance.—As will be seen by the annexed Balance Sheet, the total net income for the Financial year ending 31st December, 1884 (i.e. exclusive of balance in hand and 500*l.* on loan from Bankers), was 8464*l.* 11*s.* 7½*d.*, of which 6246*l.* 18*s.* 4*d.* consisted of entrance fees and subscriptions of Fellows. In the previous year, 1883, the total net income was 8599*l.* 9*s.*, and the amount of subscriptions, &c., 6211*l.* 0*s.* 8*d.*; in 1882 the two totals were 7937*l.* 6*s.* 10*d.*, and 5652*l.* respectively.

The net expenditure for the past year (i.e. exclusive of balance in hand) was 9266*l.* 0*s.* 5*d.*, including 2275*l.* spent on expeditions. The net expenditure in 1883 was 8624*l.* 2*s.* 11*d.*; in 1882, 8779*l.* 10*s.* 7*d.*

The Finance Committee of the Council have held, as usual, Monthly Meetings during the year, supervising the accounts of the Society. The Annual Audit was held on the 22nd of April last, the Auditors being, on behalf of the Council, Sir Rawson W. Rawson and S. W. Silver, Esq., and on behalf of the Fellows at large, E. O. Tudor, Esq., and J. Duncan Thomson, Esq. The cordial thanks of the Council and Fellows are due to these gentlemen for having freely devoted their valuable time to this important task. At the end of their labours the Auditors drew up the following Report to the Council:—

Auditors' Report.—"The Auditors appointed for the examination of the Accounts of the Royal Geographical Society for the year ending 31st December, 1884, beg to report that they have examined the Balance Sheet submitted to them, and compared it with the Cash Book, Bankers' Book, Petty Cash Book, and other books of account kept by the Society, and have verified the Balance in the Bankers' Pass Book and in the hands of the Accountant; they have checked the entries in the Cash Book, and examined all the vouchers for payments made, and have found the same to be correctly stated and sufficiently vouched.

"They have also had produced to them letters from the Chief Accountant of the Bank of England, and from Messrs. Cocks, Biddulph, and Co., Bankers, showing that there has been no change of investments in the course of the year, except the reduction, by conversion, of the interest upon India Debenture Stock held by the Society to the amount of 2000*l.* from 4 to 3½ per cent., whereby the Society loses 10*l.* a year of interest, and that the following investments were standing to its credit on the 31st December, 1884, viz.:—

	£	s.	d.
North-Eastern Railway 4 per Cent. Debenture Stock	1000	0	0
Great Indian Peninsula Railway 5 per Cent. Stock ..	4000	0	0
Great Western Railway 4½ per Cent. Stock (Davis bequest)	1800	0	0
London and North-Western Railway 4 per Cent. Debenture Stock (Murchison bequest)	1000	0	0
Caledonian Railway 4 per Cent. Preference Stock ..	2000	0	0
Norwegian 4 per Cent. Bonds	1000	0	0
Carried forward ..	10,800	0	0
	2	1	2

The following Balance Sheet and Statement, showing the Receipts and Expenditure of the Society from the year 1848 up to the present date, are annexed to the Report of the Auditors:—

<i>Receipts.</i>		BALANCE SHEET FOR THE YEAR 1884.		<i>Expenditure.</i>	
	£ s. d.	£ s. d.		£ s. d.	£ s. d.
1884.			1884.		
Balance in Bankers' hands 31st Dec. 1883..	419 5 2		House:—Taxes and Insurances, Repairs, Improvements and Furniture, Coal, Gas and Water-rate, &c. . . .	.. ..	229 9 4
Do. Accountant's do.	23 13 0½	442 18 2½	Office:—Salaries and Gratuities, Stationery and Printing, Postages and Parcels, &c. . . .	.. ..	1,555 12 11
<i>Subscriptions:—</i>			Library:—		
For the current year ..	3,971 0 0		Salaries and Books, &c.	.. ..	450 0 10½
Paid in advance ..	582 0 0		Map-Room:—		
Arrears ..	430 18 4	4,983 18 4	Salaries and Gratuities, Maps, &c. . . .	.. ..	970 4 5
<i>Entrance Fees</i> ..	.. ..	548 0 0	Meetings ..	.. ..	120 9 11
<i>Life Compositions</i> ..	.. ..	717 0 0	<i>Scientific Purposes</i>		
<i>Payments made in error</i> ..	.. ..	50 0 0	Grant:—		
<i>Parliamentary Grant</i> ..	.. ..	500 0 0	Instruction to Travelers, Map of Eastern Equatorial Africa, and payment to Inspector of Geographical Instruction ..	.. ..	291 17 4
<i>Royal Premium</i> ..	.. ..	52 10 0	<i>Medals and other awards</i> ..	.. ..	231 0 6
<i>Rent of Shop and Vaults</i> ..	.. ..	136 14 2	<i>Publications:—</i> Printing Proceedings, Maps, and Illustrations, and Second Part of Supplementary Paper ..	.. ..	3,113 5 1½
<i>Publications, Sale of, and Advertisements</i> ..	.. ..	605 4 1	<i>Payments in error returned</i> ..	.. ..	50 0 0
<i>Payments for Scientific Instruction, and Subscriptions to Map of Eastern Equatorial Africa</i> ..	.. ..	53 9 0	<i>Expeditions:—</i>		
<i>Dividends:</i>			Expenses on account East African Expedition ..	1,975 0 0	
North-Eastern Railway 4 per Cent. Debenture Stock .. 1000l.	39 3 4		Grant towards Expedition to Roraima ..	200 0 0	
Great Indian Peninsula Railway 5 per Cent. Stock .. 4000l.	249 7 3		Grant to Asia Minor Exploration Fund ..	100 0 0	
Great Western Railway 4½ per Cent. Stock [Davis Bequest] 1800l.	74 18 2			2,275 0 0	
London and North-Western Railway 4 per Cent. Debenture Stock [Murchison Bequest] 1000l.	39 3 4		<i>Balance in Bankers' hands 31st Dec. 1884 (excluding draft not cashed) ..</i>	113 1 7	
Caledonian Railway 4 per Cent. Preference Stock .. 2000l.	78 6 8		Do. Accountant's Do.	23 7 9½	141 9 4½
Norwegian 4 per Cent. Bonds .. 1000l.	39 3 4				
India Stock .. 1000l.	39 3 4				
India 3½ per Cent. Debentures .. 2000l.	78 6 8				
Consols 3669l. 2s. 2d.	107 15 8				
" [Peck Fund] 1000l.	29 7 6				
" [Back bequest] 561l. 0s. 8d.	16 9 8				
" [Trevelyan bequest] 510l. 4s. 0d.	14 19 8				
Interest on 1000l. deposited from Feb. 13 to Sept. 8 ..	8 11 5				
		814 16 0			
Amount advanced on loan by the Society's Bankers ..	.. ..	500 0 0			
		£ 9,407 9 9½			£ 9,407 9 9½

REGINALD T. COCKS,
Treasurer.

Audited and found correct, the 22nd day of April, 1885.

RAWSON W. RAWSON,
S. W. SILVER,
E. O. TUDOR,
J. D. THOMSON, } *Auditors.*

		£	s.	d.
	Brought forward ..	10,800	0	0
India Stock .. .. .	.. .. .	1000	0	0
India 3½ per Cent. Debentures .. .. .	.. .. .	2000	0	0
Consols .. .. .	.. .. .	3669	2	2
Consols (Peck Fund) .. .. .	.. .. .	1000	0	0
Consols (Back bequest) .. .. .	.. .. .	561	0	8
Consols (Trevelyan bequest) .. .. .	.. .. .	510	4	0
		<u>£19,540</u>	<u>6</u>	<u>10</u>

"It is no light matter for encouragement to the Society that its investments have exactly doubled since 1876, the year after the commencement of the Cameron expedition, and during a period in which the Society has further expended such large sums in the two expeditions into Eastern Africa.

"The Balance Sheet continues to exhibit a satisfactory result.

"The receipts of last year, as compared with those of the preceding year, after excluding the balance at the commencement of each year, the extraordinary contribution of 1000*l.* from Mr. Leigh Smith in 1883, and the loan of 500*l.* from the Bankers in 1884, are only 136*l.* less, which is owing to a diminution in the proceeds from the advertisements, amounting to 179*l.* There was a slight increase in the proceeds from the sale of publications as well as from the subscriptions, &c.

"The loan above referred to was a temporary arrangement, made near the close of the year, to prevent the necessity for a sale of stock and an almost immediate reinvestment in the first week of the present year.

"The expenditure of last year, after making corresponding deductions, shows an increase of 642*l.*, of which 491*l.* is referable to expeditions, and the balance to the cost of printing the Second Part of the Supplementary Proceedings.

"Comparing the receipts of each year with the expenditure, the year 1883 showed an even scale:—

1883, Receipts	8600 <i>l.</i>	} Excess of expenditure, 24 <i>l.</i>
Expenditure	8624 <i>l.</i>	
1884, Receipts	8464 <i>l.</i>	} " " 802 <i>l.</i>
Expenditure	9266 <i>l.</i>	

"As the payments on account of the expedition to East Africa are now completed, and as the Society received in 1883 a gift of 1000*l.* specially applicable to expeditionary purposes, of which half remains unexhausted, it cannot be said that the temporary excess was not fully justified.

"It may be useful to note that upon the average of the last two years the ordinary annual receipts may be estimated at 8500*l.*, and the ordinary expenditure, including the cost of publications, at 7000*l.*, leaving a sum of 1500*l.* applicable to expeditionary or other extraordinary purposes, without trenching upon the funded resources of the Society.

"The arrears of subscriptions, valued last year at 412*l.*, amount this year to 362*l.*

"The Investments and Assets of the Society on 31st December, 1884, show no variation, except in a small decrease in the balance at the Bankers at that date, and were estimated at 40,043*l.* 16*s.* 2*d.*

"The Auditors have pleasure in repeating the remark made last year, that the Books and Accounts have been kept, and submitted for their examination, in a satisfactory manner.

(Signed)	"RAWSON W. RAWSON,	} <i>Auditors.</i>
	"S. W. SILVER,	
	"J. D. THOMSON,	
	"E. O. TUDOR,	

"April 22nd, 1885."

The following Balance Sheet and Statement, showing the Receipts and Expenditure of the Society from the year 1848 up to the present date, are annexed to the Report of the Auditors:—

Receipts.

BALANCE SHEET FOR THE YEAR 1884.

Expenditure.

1884.	£	s.	d.	1884.	£	s.	d.	1884.	£	s.	d.
Balance in Bankers' hands 31st Dec. 1883..	419	5	2					House—Taxes and Insurances, Repairs, Improvements and Furniture, Coal, Gas and Water-rate, &c. . . . .	..	..	229 9 4
Do. Accountant's do.	23	13	0½	442	18	2½		Office:—Salaries and Gratuties, Stationery and Printing, Postages and Parcels, &c. . . . .	..	..	1,555 12 11
Subscriptions:—								Library:—			
For the current year ..	3,971	0	0	4,983	18	4		Salaries and Books, &c. . . . .	..	..	450 0 10½
Paid in advance ..	582	0	0	516	0	0		Map Room—			
Arrears ..	430	18	4	717	0	0		Salaries and Gratuties, Maps, &c. . . . .	..	..	970 4 5
				50	0	0		Meetings ..	..	..	120 9 11
				500	0	0		Scientific Purposes			
Entrance Fees ..	..	..	..	52	10	0		Grant:—			
Life Compositions ..	..	..	..	136	14	2		Instruction to Travelers, Map of Eastern			
Payments made in error	..	..	..	605	4	1		Equatorial Africa, and	..	..	291 17 4
Parliamentary Grant ..	..	..	..					payment to Inspector			
Royal Premium ..	..	..	..					of Geographical In-			
Rent of Shop and Vaults	..	..	..					struction ..	..	..	231 0 6
Publications, Sale of, and	..	..	..					Medals and other awards			
Advertisements ..	..	..	..					Publications:—Printing			
Payments for Scientific	..	..	..					Proceedings, Maps, and	..	..	3,113 5 1½
Instruction, and Sub-	..	..	..					Illustrations, and Second			
scriptions to Map of	..	..	..					Part of Supplement			
Eastern Equatorial								ary Paper ..	..	..	50 0 0
Africa ..								Payments in error returned			
Dividends:								Expeditions:—			
North-Eastern Railway	39	3	4					Expenses on account	1,975	0	0
4 per Cent. Debenture								East African Ex-			
Stock .. 1000 <i>l.</i>								pedition ..	200	0	0
Great Indian Peninsula	249	7	3					Grant towards Ex-			
Railway 5 per Cent.								pedition to Kosiama	100	0	0
Stock .. 4000 <i>l.</i>								Grant to Asia Minor			
Great Western Railway	74	18	2					Exploration Fund			2,275 0 0
4½ per Cent. Stock											
[Davis Bequest] 1800 <i>l.</i>								Balance in Bankers'			
London and North-	39	3	4					hands 31st Dec. 1884	113	1	7
Western Railway								(excluding draft not			
4 per Cent. Debenture								cashd) ..	23	7	9½
Stock [Murchison Bequest] 1000 <i>l.</i>								Do. Accountant's Do.			141 9 4½
Caledonian Railway	78	6	8								
4 per Cent. Preference											
Stock .. 2000 <i>l.</i>											
Norwegian .. 2000 <i>l.</i>	39	3	4								
Bonds .. 1000 <i>l.</i>	39	3	4								
India Stock .. 1000 <i>l.</i>	78	6	8								
India 3½ per Cent. De-	107	15	8								
bentures .. 2000 <i>l.</i>	29	7	6								
Consols 3669 <i>l.</i> 2s. 2d.	16	9	8								
" [Peck Fund]	14	19	8								
" [Back bequest]	8	11	5								
" 561 <i>l.</i> 0s. 8d.											
" [Trevelyan be-											
quest] 510 <i>l.</i> 4s. 0d.											
Interest on 1000 <i>l.</i> de-											
posited from Feb. 13											
to Sept. 8 ..											
				814	16	0					
Amount advanced on											
loan by the Society's	..	..	..	500	0	0					
Bankers ..											

REGINALD T. COCKS,
Treasurer.

Audited and found correct, the 22nd day of April, 1885.

RAWSON W. RAWSON,
S. W. SILVER,
F. O. TUDOR,
J. D. THOMSON, } *Auditors.*

STATEMENT showing the RECEIPTS and EXPENDITURE of the Society from the Year 1848 to the 31st Dec., 1884.

	Year.	Cash Receipts within the Year.	Cash Amounts invested in Funds.	Deducting Amounts invested in Funds; actual Expenditure.
		£ s. d.	£ s. d.	£ s. d.
¹ Includes Treasury Grant of 1000 <i>l.</i> for the East African Expedition.	1848	696 10 5	.. ..	755 6 1
	1849	778 3 0	.. ..	1,098 7 6
	1850	1,036 10 5	.. ..	877 2 10
² Includes Treasury Grant of 2500 <i>l.</i> for the East African Expedition.	1851	1,056 11 8	.. ..	906 14 7
	1852	1,220 3 4	.. ..	995 13 1
³ Includes Legacy of Mr. Benjamin Oliveira, 1506 <i>l.</i> 17 <i>s.</i> 1 <i>d.</i>	1853	1,917 2 6	.. ..	1,675 6 0
	1854	2,565 7 8	.. ..	2,197 19 3
	1855	2,584 7 0	.. ..	2,636 3 1
⁴ Includes Legacy of Mr. Alfred Davis, 1800 <i>l.</i>	1856	3,372 5 1	533 10 0	2,814 8 1
	1857	3,142 13 4	378 0 0	3,480 19 9
	1858	3,089 15 1	.. ..	2,944 13 6
⁵ Includes Legacy of Sir Roderick Murchison, 1000 <i>l.</i>	1859	3,471 11 8	950 0 0	3,423 3 9
	1860	5,449 12 1	466 17 6	5,406 3 7
⁶ Includes Mr. James Young's Grant for Congo Expedition, 2000 <i>l.</i>	1861	4,792 12 9	1,358 2 6	3,074 7 4
	1862	4,659 7 9	1,329 7 6	3,095 19 4
⁷ Includes 1009 <i>l.</i> 14 <i>s.</i> 6 <i>d.</i> sale of Exchequer Bills.	1863	5,258 9 3	1,837 10 0	3,655 4 0
	1864	4,977 8 6	1,798 5 0	3,647 7 10
	1865	4,905 8 3	1,041 5 0	4,307 4 5
⁸ Includes Mr. James Young's Grant for the Congo Expedition, 1041 <i>l.</i> 14 <i>s.</i>	1866	5,085 8 3	1,028 15 0	4,052 15 0
	1867	5,462 7 11	1,029 0 6	3,943 17 4
	1868	5,991 4 0	1,857 3 9	4,156 17 10
⁹ Includes Parliamentary Grant of 3000 <i>l.</i> to Cameron Expedition.	1869	5,859 16 0	2,131 5 0	4,646 0 8
	1870	5,042 6 1	3,802 6 0	3,445 10 6
	1871	5,637 3 7	1,000 0 0	3,726 4 4
¹⁰ Includes Donation of 500 <i>l.</i> by Mr. C. J. Lambert.	1872	5,119 7 9	1,999 4 6	5,871 13 2
	1873	7,761 18 10	2,015 1 8	6,697 12 6
¹¹ Includes Legacy of Admiral Sir George Back, 540 <i>l.</i>	1874	5,753 5 10	499 0 0	7,876 2 3
	1875	7,934 15 10	2,002 7 6	5,683 4 10
	1876	11,611 11 8	.. ..	6,870 13 1
¹² Includes Legacy of Sir W. C. Trevelyan, 500 <i>l.</i>	1877	107,950 1 11	2,538 2 0	8,940 17 11*
	1878	18,124 10 0	3,000 0 0	6,361 9 6
¹³ Includes 1005 <i>l.</i> 8 <i>s.</i> 2 <i>d.</i> , sale of Exchequer Bills.	1879	18,979 14 10	1,551 10 10	6,990 14 2
	1880	8,599 18 4	1,567 5 1	8,454 1 10†
	1881	8,809 19 5	.. ..	8,462 5 6‡
¹⁴ Includes 1000 <i>l.</i> received from Mr. B. Leigh Smith.	1882	5,942 15 0	.. ..	8,779 10 7
	1883	19,599 9 0	1,001 5 0	8,624 2 11
¹⁵ Includes 500 <i>l.</i> on loan from Bankers.	1884	18,964 11 7‡	.. ..	9,266 0 0

* This sum includes the Special Parliamentary Grant transferred to the Cameron Expedition Fund in February, 1877.

† This amount includes the payment of two sums of 500*l.* each, contributed to the African Exploration Fund in this and the previous year.

‡ This sum includes the payment of 102*l.* 8*s.* to the African Exploration Fund; also 714*l.* 9*s.* 1*d.*, the final payment for Cameron Expedition Fund.

STATEMENT OF ASSETS—31st December, 1884.

	£	s.	d.
Freehold House, Fittings, and Furniture, estimated (exclusive of Map Collections and Library insured for 10,000 <i>l.</i>)	..	20,000	0 0
Investments (amount of Stock), as detailed in the above Report of the Auditors	..	19,540	6 10
Arrears due on December 31, 1884	..	£906	18 0
Estimated at	..	..	362 0 0
Balance at Bank	..	£113	1 7
„ in Accountant's hands	..	28	7 9½
			141 9 4½
Total	..	£40,043	16 2½

Publications.—The monthly 'Proceedings' have been issued with the same punctuality as before throughout the year; the completed volume for 1884, the sixth of the series, consisting of 795 pages, illustrated by 29 maps and 2 pictorial illustrations. The total cost of the volume was 210*l.* 1*s.* 2*d.*, including for

printing 1143*l.* 1*s.* 6*d.*, for maps and illustrations 688*l.* 19*s.* 11*d.*, and for free delivery to Fellows and Institutions 275*l.* 19*s.* 9*d.* Part 2, of Vol. I., 'Supplementary Papers' has also been issued during the year, its cost for printing being 110*l.* 9*s.* 3*d.*, and for the map illustrating it 67*l.* 5*s.* Against the above outlay are to be set the receipts from the sale of our publications to the public and from advertisements, which in 1884 amounted to 605*l.* 4*s.* 1*d.*

Scientific Purposes Grant.—During the past year sixteen intending travellers have received instruction under Mr. Coles, in Practical Astronomy in the Society's Observatory, and in route-surveying in the country.

The gentlemen who have been instructed have proceeded to the following destinations:—Burma, East Africa, Central America, Australia, River Niger, Labrador, and Somali Land. Four gentlemen are at present under instruction, and the total number of hours devoted to teaching during the year was 303.

The Inspector of Geographical Education entered on his duties soon after the issue of the last Council Report, and in the autumn made his first visit to the continent in pursuance of his inquiries. An expenditure of 100*l.*, included in the balance sheet for the year, under this head.

Expeditions, Grants of Instruments to Travellers.—Mr. Joseph Thomson, the leader of the Society's Expedition through Masai Land to Victoria Nyanza, returned in July, having carried out his instructions to the entire satisfaction of the Council. The sum of 1975*l.* was expended during the year on this account, a sum which includes an honorarium (360*l.*) to the leader. Adding 15*l.*, the cost of a presentation watch to Martin, Mr. Thomson's faithful assistant, the total cost of this successful expedition has been 3607*l.* 1*s.* 8*d.*

A grant of 200*l.* in aid of Mr. Thurn's expedition to Mt. Roraima, and another of 100*l.* to Mr. W. M. Ramsay's topographical and archæological explorations in Asia Minor, have also been made this year out of the funds of the Society.

Instruments to the value of 243*l.* 13*s.* 6*d.* have been lent during the past year to the following travellers:—Dr. E. J. Baxter, East Africa, 27*l.* 1*s.*; Mr. A. P. Maudslay, Guatemala, 93*l.* 5*s.* 6*d.*; Mr. Joseph Thomson, West Africa, 4*l.* 10*s.*; Mr. H. O. Forbes, New Guinea, 57*l.* 3*s.* 6*d.*; Mr. H. W. Seton-Karr, Lake Massassini, 61*l.* 13*s.* 6*d.*

The instruments lent to the Rev. T. J. Comber (River Congo) in 1879, Mr. H. Whitely (British Guiana) in 1882, Mr. Joseph Thomson (East Africa) in 1882, Commander C. D. Gissing, R.N. (Mombasa), 1883, and Mr. H. H. Johnston (Mt. Kilima-Njaro), 1884, have been returned.

Library.—The Society has lost during the year their very efficient Librarian, Mr. E. C. Rye, who died on the 7th of February. In March the Committee appointed to the vacant post, after carefully sifting the qualifications of 17 candidates, Mr. J. Scott Keltie, who was then about completing his labours as the Society's Inspector of Geographical Education.

748 books and pamphlets have been added during the past year; 546 by donation or exchange, and 202 by purchase. The notices of new books in the 'Proceedings' continue to attract presentations by publishers and authors, perhaps to a greater extent than previously.

118 pamphlets have been put in covers by the Society's map-mounter, and 229 volumes have been bound.

The sum of 78*l.* 4*s.* 6*d.* has been expended in purchasing books, and the further sum of 75*l.* 6*s.* 9*d.* in binding for the Library.

Among the more important accessions are:—'Estudios hidrográficos sobre la Patagonia Occidental' (presented by F. Vidal Gormáz); Stewart's 'Report on the Soudan,' 1883; continuation of the Reports of the Scientific Results of the Voyage

of the *Challenger* (by the Lords of the Treasury); the publications of the Intelligence Department of the War Office, and of the Meteorological Office; Parliamentary Papers of geographical interest issued from time to time (Lord Arthur Russell); continuations of the General Report of the Surveys of India, the Synopsis of the Results of the Great Trigonometrical Survey, North-West Provinces Gazetteer, 29 district Gazetteers of the Punjab, Mackenzie's 'History of the Relations of the Government with the Hill Tribes of the North-East Frontier of Bengal,' Hennessey's 'Report of A—k's Explorations in Great Tibet and Mongolia,' and Karaka's 'History of the Parsis,' 2 vols. (H.M. Secretary of State for India); continuations of the Memoirs and Records of the Geological Survey of India (the Indian Government); 'Annuaire Statistique de la Province de Buénos-Ayres,' 1^{re} and 2^{me} Années; Lesson's 'Polynésien,' 4 vols.; Fleurieu's 'Discoveries of the French in 1768 and 1769 to the South-east of New Guinea'; Meyer's Reisebücher 'Der Orient,' II. Band; new editions of Murray's and Badeker's Guide-Books; Piasetsky's 'Russian Travellers in Mongolia and China,' 2 vols. (Messrs. Chapman and Hall); 28 volumes of 'Globe'; 'The Survey of Western Palestine'; Léon de Rosny's 'Catalogue de la Bibliothèque Japonaise de Nordenskiöld (Baron Nordenskiöld); Paulitschke's 'Die geographische Erforschung der Adäl-Länder' (Mr. E. C. Rye); Mittheilungen der Riebeck'schen Niger Expedition, I. and II., and Riebeck's 'Chittagong Hill Tribes' (Dr. Riebeck); Blackwood's Educational Series, Five Geographical Readers and Primer (Mr. E. G. Ravenstein); M'Clintock's 'Voyage of the *Fox* in the Arctic Seas,' 5th edition (Author); Vols. V. and VI. of Schefer and Cordier's 'Recueil des Voyages'; the Publications de l'École des Langues Orientales Vivantes (the French Minister of Public Instruction); various publications of the Dépôt des Cartes et Plans de la Marine, the Chinese Imperial Maritime Customs, the New Zealand Colonial Museum and Geological Survey Department, and the Victoria and Queensland Governments; the continuation of Powell and King's Geological Survey Reports, Professional Papers of the Signal Service, Annual Reports of the Chief of Engineers and Chief Signal-Officer, the reports and publications of the Coast and Geodetic Survey, the Office of Naval Intelligence and the Bureau of Navigation, United States of America; Donaldson's 'The Public Domain'; Gilbert, 'A New Method of Measuring Heights by means of the Barometer' (Mr. J. K. Laughton); Progress Report of the Geological and Natural History Survey of Canada (the Director of the Survey); the Hakluyt Society's Publications; the Norwegian North-Atlantic Expedition (the Editorial Committee); Saint-Martin's 'Nouveau Dictionnaire de Géographie Universelle'; Reclus's 'Nouvelle Géographie Universelle'; Kerry-Nicholls's 'The King Country' (Author); Lecky's 'Wrinkles in Practical Navigation' (Author); Nagamaiya's 'Report on the Census of Travancore,' Feb. 1881 (Râma Varmâ); Mejiow's 'Recueil du Turkestan,' Tomes 151–300 (Mr. J. Pierce); Sinclair and Fyfe's 'Handbook of Jamaica for 1884–85'; Silver and Co.'s 'Handbook to Canada' (S. W. Silver and Co.); Die Balearen, Fünfter Band, in two parts (the Archduke Ludwig Salvator of Austria); Lista's 'Misiones,' Zeballos's 'Conquista de Quince Mil Leguas,' 2nd edition, Bove's 'Expedicion Austral Argentina' (Don Saturnina Salas); Archives des Missions scientifiques et littéraires, Vols. I.–VI., 2nd Series, I.–VII., 3rd Series, I.–IX.; Findlay's S. Pacific Ocean Directory, 5th edition (Mr. R. H. Laurie); Lenz's 'Timbuktu,' 2 vols. (Author); Doughty, 'Documents épigraphiques recueillis dans le Nord de l'Arabie'; Güssfeldt's 'Reise in den centralen chileno-argentinischen Andes' (Author); Jacobs's 'Eenigen tijd onder de Baliërs' (G. Kolff and Co.); Rawson's 'British and Foreign Colonies' (Sir Rawson W. Rawson); Hunter's Report on the Province of Harrar (Major Hunter); Prjevalsky's 'Reisen in Tibet, 1879 bis 1880'; Prince Roland Bonaparte's 'Les Habitants de Suriname' and 'Les

derniers voyages des Néerlandais à la Nouvelle-Guinée' (Author); Lord How Island (the Government of New South Wales, through Mr. F. E. Joseph); continuation of Veth's 'Midden-Sumatra'; Recensement Général de l'Égypte, Vol. I. (the Director of the Census); Selwyn and Dawson's 'Descriptive sketch of the Physical Geography and Geology of the Dominion of Canada' (the Director Geological and Natural History Survey of Canada); Thomson's 'Through Masai Land' (the publishers on behalf of the Author); 'Segelhandbuch für den Atlantischen Ozean,' with atlas; Jahrbuch des Schweizer Alpenclub, Vols. I.-XIX., Mittheilungen des Oesterreichischen Alpen-Vereines, Vols. I and II., Jahrbuch des Oesterreichischen Alpen-Vereines, Vols. I.-IX., Zeitschrift des Deutschen Alpenvereins, Vols. I.-XV., Annuaire du Club Alpine Français, 1874-1883; Census Reports of England and Wales, 1881, 4 vols., Ireland, 1881, Part II. (the Registrar-Generals); Census of Cyprus, 1881; Coles's 'Summer Travelling in Iceland' (Author); and the last three volumes of the Encyclopædia Britannica, 9th edition (Messrs. A. and C. Black).

The Library continues to be largely consulted by the Fellows of the Society; it also affords much valuable aid to public officers, and general inquirers.

Map Room.—The accessions to the Map Room Collection during the past year comprise 1801 Maps and Charts on 2414 sheets, being in excess of the year before by 79 Maps on 697 sheets; 16 Atlases, containing 1152 sheets of Maps, and 12 Photographs and Views. Of these, 51 Maps on 31 sheets, and 7 Atlases have been purchased.

Among the most important donations to the Map Room Collection are:—1247 sheets of the Ordnance Survey of the British Isles (presented by the First Commissioner of Public Works, through the Director-General of the Ordnance Survey); 80 Charts of the British Admiralty (The Lords Commissioners of the Admiralty, through the Hydrographer); 307 sheets of the various Indian Government Surveys (H.M. Secretary of State for India); 5 sheets of Maps of Egyptian Soudan, &c. (Intelligence Branch of the Quartermaster-General's Department); 36 French Charts (Dépôt des Cartes et Plans de la Marine); 22 United States Charts (Commander J. R. Bartlett, U.S.N., Hydrographer to the Bureau of Navigation); 14 Maps, published in Petermann's 'Geographische Mittheilungen' (the Publisher); 50 sheets, in portfolio, of Plans, Elevations, Sections, and showing results of the excavations at Jerusalem, 1867-70 (Palestine Exploration Fund); 53 Maps, Plans, &c., of various parts of Brazil (H.E. the Brazilian Minister of the Interior); The Royal Atlas of Modern Geography (new edition) and various Maps, published by Messrs. W. and A. K. Johnston (the Publishers); large Railway Map of the Dominion of Canada (Canadian Pacific Railway Company); 12 sheets of Carte d'Afrique, scale 1:2,000,000, 11 sheets Carte de la Tunisie, 1:200,000, and 17 sheets of Carte Topographique de l'Algérie, 1:50,000 (M. le Ministre de la Guerre, Paris); 10 sheets of the Geological Survey of Sweden (Institut Royal Géologique de la Suède); 24 sheets of various Norwegian Surveys (Institut Géographique de Norvège); Carta do Curso do Rio Zaire de Stanley-Pool ao Oceano (Lieut.-Col. Vicomte de Pernes); 2 copies of a Map of the Corea, with list of Corean geographical names, prepared by E. M. Satow (H.M. Secretary of State for Foreign Affairs); 6 sheets of Generalstabens Topographiske Kaart over Danmark (the Danish Minister of War); 3 parts, containing 36 sheets, of the Topographischer Atlas der Schweiz (Bureau Topograph Fédéral, Berne); 7 Maps and Plans of various districts in Queensland (Queensland Government); Atlas to accompany the Monograph on the Geology of the Comstock Lode and the Washoe District (Director of the U.S. Geological Survey); Atlas Pintoresco é Historico de los Estados Mexicanos par Antonio Garcia Cubas (the Mexican Minister of the Interior).

The Maps in the Society's Collection have been made frequent use of by the Fellows of the Society, public officers, and the general public. The large Maps and Views have been frequently lent to illustrate public and private lectures, and fourteen new diagrams have been constructed on the premises.

The adoption of the above Report was moved by General Sir H. L. THUILLIER, C.S.I., F.R.S., who said the interests of the Society were in the best possible hands, and that nothing was wanting on the part of the Executive to increase the honour and credit of the Society; the money spent by the Council on various expeditions was applied to the best advantage, and the members could not be too grateful to those gentlemen who gave their valuable time to the service of the Society.—The motion was seconded by Sir H. BARKLY, G.C.M.G., K.C.B., and carried unanimously.

PRESENTATION OF THE ROYAL MEDALS.

The Royal Medals of the year for the Encouragement of Geographical Science and Discovery had been awarded by the Council as follows :—

The Founder's Medal to Mr. JOSEPH THOMSON, in recognition of the great services he has rendered to geography, by carrying out with admirable zeal, promptitude, and success the two expeditions into East Central Africa with which he was charged by the Society; viz. that of 1878–80 (when he succeeded to the command on the death of Mr. Keith Johnston) to Lake Nyassa and Tanganyika; and that of 1882–4, through the Massai Country to Victoria Nyanza and to Mount Kenia; and for the extensive addition he has made to our accurate geographical knowledge of the regions explored.

The Patron's or Victoria Medal to Mr. H. E. O'NEILL, for his thirteen journeys of exploration along the coast and in the interior of Mozambique, during the past five years; in one of which he reached Lake Shirwa and discovered the more northerly Lakes Amaramba and Chiuta, and in another explored a new and direct overland route from Blantyre to the coast; also for his extensive series of lunar observations to fix the longitude of Blantyre, and his accurate surveys of the countries explored.

In the absence (in Western Africa) of Mr. Thomson, the medal decreed to him was received by Sir Rutherford Alcock, K.C.B. The PRESIDENT, in announcing this to the Meeting, said that no more fitting person could be found for such a purpose, Sir Rutherford having been President of the Society at the time Mr. Thomson was engaged to serve in the first expedition, and having taken a very strong personal interest in all its operations.

The PRESIDENT, in continuation, said: The successful completion of his second great African Expedition must have prepared the Society for the selection of Mr. Thomson for the honour of receiving the Founder's Medal. His career as a geographical traveller has been singularly rapid and remarkable. At the early age of twenty-one he was, on the recommendation of Professor Geikie, selected as geologist to accompany the expedition sent out by this Society in 1878, and headed by Mr. Keith Johnston, for the purpose of discovering a direct route from the East African Coast to the northern portion of Lake Nyassa. On the early death of Mr. Keith Johnston, Mr. Thomson, young and inexperienced as he was, undertook the charge of the expedition, which he carried to a successful end, accomplishing, in fact, far more than was expected from it. He continued his explorations far along the south-eastern shores of Lake Tanganyika, traversing in a journey of some 2500 miles, more than 700 miles of an entirely unknown country, and discovering Lake Leopold and several mountain ranges. During all this time, by the

courage, patience, and tact displayed in the management of his followers and in his negotiations with suspicious and often unfriendly native tribes, he not only secured the success of a most difficult enterprise, but proved himself to be a born leader of men. After some further experience of East Africa, while in the employment of the Sultan of Zanzibar, he was selected by the Society in 1882 for the purpose of conducting their expedition through the Masai country to the eastern shores of Lake Victoria Nyanza and to Mount Kenia. His account of that interesting and dangerous journey must have been read by most of you, and I will venture to say that it not only justified his choice by the Society as its leader, but has stamped him as one of the ablest travellers that ever devoted himself to African exploration. The cheerfulness with which he endured hardships, delays, obstacles of every sort, and even insults from his barbarous hosts, the patient skill with which he converted his half-hearted and mutinous followers into a band of devoted and trustworthy friends, his quiet tenacity of purpose, his dexterity in dealing with warlike and aggressive tribes, and the accomplishment of this perilous journey without shedding a drop of human blood—all these qualities and deeds point him out as one in the foremost rank even of those distinguished travellers, of many countries, who have been selected by the Society for their highest honour.

Sir RUTHERFORD ALCOCK, in acknowledging the honour on behalf of Mr. Thomson, said that although it was a matter of regret Mr. Thomson was not present to receive in person the highest honour which it was in the power of the Society to confer, he (Sir Rutherford) felt it a pleasure to receive it for him vicariously, because he could say for him what his modesty would not permit Mr. Thomson to say for himself. The President had fully gone into the great merits and qualifications which Mr. Thomson had shown during his two most hazardous and adventurous explorations. These had been carried out in an unusually short time, very economically, and with perfect safety and success, not only to himself but also to his followers. When he came back from his second expedition, Mr. Thomson had the proud satisfaction of being able to state that he had not lost a bale of cloth nor a man from any accident or hostility. It was true that one man died of sickness, but he had never pulled a hostile trigger against a native. That was a very rare merit, and he was to be envied for being able to make such an announcement. Some other travellers had had different experience in Africa, and probably unavoidably had come into collision with the inhabitants. Mr. Thomson had run equal risks, and in the two papers he read before the Society, he had given very graphic accounts of incidents where it seemed as if it were almost inevitable that the whole of his people and himself must perish. When he (Sir Rutherford Alcock) was Chairman of the African Exploration Fund Committee, which was formed at the time of the establishment of the International African Association at Brussels, the Council thought they must not be left last in the race. All Europe at that time seemed to be awakening under the impulse of the King of the Belgians, and Africa was to be opened up by systematic explorations. It was then felt that it was not fitting that the Royal Geographical Society, which had led the way for the better part of a century, from Bruce in Abyssinia to Livingstone in the south, and Speke and Grant, who immortalised their names by the discovery of the Lakes, should stand out of the field and leave others to reap a glorious harvest. In consequence, it was determined to fit out an expedition—first, to try and find the best way to connect the East Coast with Nyassa, and secondly, a connecting road between Nyassa and the south of Tanganyika, which was also unexplored ground. The Committee had the advantage of securing the services of a scientific and accomplished geographer in Mr. Keith Johnston, whose loss they so soon had to deplore. A Scotch youth barely twenty-one also offered his services.

He was fresh from the University of Edinburgh, and had a very high testimonial from Professor A. Geikie. With a certain knowledge of geology he had that training which Scotch lads receive, and a good practical understanding as to what the business of life consisted of. The Committee felt some doubt and hesitation as to whether they were justified in appointing him Geologist and general Assistant to Mr. Johnston. He (Sir Rutherford Alcock) well remembered scanning Mr. Thomson and thinking that he could see a good deal of character and determination in his face. The expedition was one of the best equipped that had ever left the East African Coast, according to the testimony of Sir John Kirk, but within three weeks Mr. Keith Johnston was seized with fever and dysentery; he had to be carried through swamp and morass for a fortnight until they arrived at a halting-station, and there he died. In order that the meeting might realise what sort of man Mr. Thomson was, he would read a short passage in which he described the first impression made upon him when he was left alone on that occasion in Africa. He says: "It would be impossible to give you even a faint notion of my position on this unhappy occasion. For the first time in my life and in the heart of Africa I looked upon death and felt myself alone in every sense of the term. At the age of twenty-two I found myself at the head of a work in which few have succeeded, a work of which I was almost totally ignorant. The question was then whether I should turn back or go forward. But though the question arose, it was never entertained; with my foot on the threshold of the unknown, I felt I must go forward, whatever might be my destiny."

It was in that spirit that men went forward to conquest in every field of enterprise and of life. Mr. Thomson felt confidence in himself, and he came successfully out of the trial. He did all that he was required to do, and added valuable fruits to geographical knowledge. In 1882 the Society again engaged him to perform perhaps a more hazardous expedition through the Masai Country, inhabited by a warlike and barbarous race. That country had never been thoroughly penetrated before, but Mr. Thomson accomplished the task amid manifold perils, and made one of the most valuable contributions to the geography of the interior of Africa that had been obtained in modern times. He had well earned the highest honour that the Geographical Society could confer upon him. He was the youngest of the list of medallists, but taking into account all the conditions and circumstances in which he worked and triumphed, the Society must feel that they could not have added to the number one who was more deserving the honour.

The Patron's Medal was presented to Mr. O'Neill in person. The PRESIDENT spoke as follows:—

Mr. O'NEILL's record of travel is of a most meritorious character. His interest in African travel was first excited in cruising from 1875 to 1879 as a naval officer along the south-eastern coast of Africa, when he received the thanks of the War and Colonial Departments for his reports upon the coast and the adjoining regions. He subsequently surveyed the whole coast of Mozambique to Cape Delgado Bay, discovering bays and rivers which were unknown to the Portuguese possessors of that country during the 400 years of their occupation. Having received the appointment of H.M. Consul at Mozambique, he then directed his attention to the interior, executing a great number of expeditions through regions wholly unknown to Europeans, in one of which he reached Lake Shirwa, and discovered the more northerly lakes Amaramba and Chiuta, and in another explored a new and direct overland route from Blantyre to the coast. During all these years, from 1880 to 1885, he transmitted to the Society papers of the utmost scientific value to geographers from the care taken to make accurate surveys of the extensive tracts he explored. When at Blantyre, near the river Shiré, he took an extensive series of

lunar observations to fix the longitude of that position ; from which, under the direction of the Society, 84 sets have since been calculated, which will go far to establish a secondary meridian in East Central Africa, a great desideratum to all explorers and cartographers. But Mr. O'Neill has proved himself to be much more than a mere surveyor or explorer. His observations on the native tribes, their laws and customs, their ethnic relations and languages ; his remarks on the physical geography of the districts, their products and resources and commercial routes, have always given a special value to his contributions to our 'Proceedings'; and when we remember that Mr. O'Neill has never been master of his time ; that his geographical work has been executed either as part of his official duty, or during his leaves of absence, and often at a considerable personal sacrifice, you will be of opinion that the Council have considered their Patron's Medal a well-merited acknowledgment for services to geographical science so long, so valuable, and in their accumulated bulk so extensive.

Mr. H. E. O'NEILL, on receiving the medal, expressed his very hearty thanks for the distinction which had just been conferred upon him. He would freely confess that for more than five years past he had steadily kept before himself the possible attainment of this honour, and he had striven in every moment of leisure from official duty to do something to advance his claim to it. He might call the medal the Victoria Cross of English travellers, and its image reflected in the imagination oftentimes accompanied them on their travels. He hoped that he was not to be accused of being devoid of all other motives except what some might call medal-hunger, when he said that the desire to obtain it inspired travellers to do the very best they could. It made them blind to difficulties ; it turned hardships into pleasure ; it made fatigue light ; it robbed fever of its terrors, and made danger doubly welcome. His Lordship had alluded in very flattering terms to the astronomical work that he (Mr. O'Neill) had done. Perhaps he might be permitted to say how it came about that he took so much time and trouble over it. Many Englishmen at the present time thought that there was much to be learned from Germany, and when casting about for the best way in which to make his journey useful to geography, he not unnaturally turned to what had been done by the German explorers of Western Africa, and he was struck by nothing so much as by the unusually large number of observations taken by their leader Dr. Pogge when he desired to fix a position with accuracy. He carefully noted the number of those observations and endeavoured to reach the same figure, and wherever it was possible to double it. It was to the determination he then formed that he owed the very kind words of praise that his Lordship had just bestowed upon him. But he did not wish to be understood as regarding his work as in any way commensurate with so high and great a reward as he had now received, and he would ask permission to be allowed to look upon the medal rather as a mark of confidence, as a talent in trust, for which he had yet to render good account. He would promise that if health and opportunity were granted him, he would not spare the one nor lose the other, in order to deserve the honoured possession of the gold medal of the Royal Geographical Society.

THE AWARD OF THE MURCHISON, BACK, AND CUTHBERT PERK GRANTS.

The PRESIDENT next read over the terms of the awards for 1885, of the above grants.

The MURCHISON GRANT to the Pandit Krishna, for his four explorations made while attached to the Survey of India ; and particularly for his extensive and important journey in 1879-82 from near Lhasa across the high plateau of Tibet to Chaidam, and thence to Sachu and Darchendo, returning via Batang and Sama to near Lhasa and India ; altogether a survey of 2800 miles.

The **BACK GRANT** to Mr. W. O. HODGKINSON, for his three great journeys of exploration in Australia: 1, as volunteer in Burke and Wills's Expedition; 2, as second in command of M'Kinlay's Expedition from Adelaide to the Gulf of Carpentaria; and 3, in 1876-7, as leader of the expedition which surveyed the western boundaries of Queensland.

The **CUTHBERT PEEK GRANT** to Mr. J. T. LAST, for his surveys and ethnological researches in the Southern Masai, Nguru, and neighbouring countries, during his long residence at Mamboia in East Central Africa; for the valuable papers and maps contributed on those subjects to the Society's 'Proceedings'; and as an encouragement to him in his further scientific investigations.

The three Honorary Corresponding Memberships for 1885 had been voted to Chief Justice Chas. P. Daly, LL.D., of New York, M. Elisée Reclus, and M. Moritz von Déchy.*

The Ballot for the New Council was next taken.

THE ANNUAL ADDRESS.

The **PRESIDENT** then read the Annual Address on the Progress of Geography (*ante*, p. 417). On its conclusion:—

Sir **RICHARD TEMPLE**, Bart., rose to propose a vote of cordial thanks to the President for the luminous, graphic, interesting, and truly cosmopolitan address which his Lordship had just delivered. He felt peculiar satisfaction in proposing this vote because the Address most particularly alluded to that Asiatic quarter of the world with which many present were specially acquainted, and they were proud to hear from his Lordship's eloquent lips a recognition of the service rendered to geography by Indian officers, who, in all their labours, remembered the honour of England and had been patriots as well as geographers. He had also listened with extreme interest to the details regarding geographical exploration in other quarters of the world, many of which had occurred during the past year, and had great importance with reference to the commercial future of the Anglo-Saxon race in various parts of the habitable globe. The Society recognised the generous spirit with which his Lordship had alluded to the labours of foreign as well as British travellers. But beyond this they observed the manner in which he had treated the important problem of the future geographical instruction of the rising generation. Though the educational authorities of this country had failed to recognise it, yet the members of this Society were well aware that this question of geography was of truly national importance, because geographical knowledge was not only the handmaid to many branches of physical science, but was also essential to a proper comprehension of political and commercial interests throughout the world. He would request his Lordship not to let this matter drop, but although he might resign his presidency, still to lend the weight of his great authority to such representations as the Society

* The **MEDALS**, for the Promotion of Geographical Education, placed by the Society at the disposal of the syndicates respectively of the Oxford and Cambridge Local Examinations, were awarded as follows:—

1884. Oxford (June).—*Silver Medal*—Thomas Alfred Lawrenson, Liverpool. *Bronze Medal*—Jesse Alfred Twemlow, Liverpool.

Cambridge (December).—*Silver Medal*—(Physical Geography)—Alice Gadd. *Silver Medal*—(Political Geography)—Charles Victor Crook.

The **PRIZE ATLASES** offered for competition by the Society to the cadets of the Nautical Training Colleges, on board H.M. ships *Worcester* and *Conway*, were awarded at the geographical examinations, held in July 1884, to the following: H.M.S. *Worcester*, E. G. Smith; H.M.S. *Conway*, G. W. Barber.

might make in the proper quarter, in order that the science of geographical instruction as well as the science of geography itself, might be properly understood throughout the length and breadth of the realm. In conclusion, he assured his Lordship of the deep regret with which they learned that they had now heard his farewell address, and that the members of the Society would never forget the scholar-like knowledge, the statesmanlike capacity, the comprehensive consideration, the practical, kindly, and courteous aptitude which he had never failed to bring to bear on the proceedings of the Society.

Sir JOSEPH HOOKER seconded the motion. He said he agreed with all that had fallen from Sir R. Temple's lips in praise of the President's addresses. For five years he had been in the habit of delivering them, and they were all of the most admirable description. One of the first functions of a President of the Society was to deliver to the Fellows once a year a *résumé* of all that had occurred in the geographical world. The President had done so in a way which merited the approbation of all the members. For fulness and conciseness, and generous appreciation of the labours of Continental as well as British geographers, his addresses had been distinguished for their excellence. He sincerely regretted, as he was sure every one present did, that they had just listened to the last that would fall from his lips.

The PRESIDENT thanked the members for the kind manner in which they had received the words of Sir Richard Temple and Sir Joseph Hooker. He need hardly say that such praise could scarcely have come from lips more grateful to him than those of the two eminent men who had spoken. Although his connection with the Society as its President might cease, he hoped that his connection with it as a fellow-labourer on the Council might long continue. He looked back with much regret to the many years in which he was a member of the Society without availing himself of the advantages offered to those who regularly attended the meetings; but having once begun he felt quite certain that he should never cease so long as he could be of any use. He was not a scientific geographer, but men who had been connected with the administration of the affairs of the country, and especially those who had been interested in the education of the country, ought to be able to be of some little service in extending the knowledge of geography, and in discovering the best means to be taken for that purpose. He accepted with readiness, and even thankfulness, Sir Richard Temple's suggestion that a field of usefulness was opened to him in that direction. All he could say was that he hoped that during the years his successor held the honourable position of President the time might pass as pleasantly to him, and on the same cordial terms with his audience and the eminent Fellows of the Society, as it had done with him during the last five years.

The Scrutineers declared the result of the Ballot to the effect that the list as recommended by the Council had been duly elected. The list is as follows (the names printed in *italics* being New Members, or those who change office):—

President:—*The Most Hon. the Marquis of Lorne*, K.T., G.C.M.G. *Vice-Presidents*: Francis Galton, Esq., F.R.S.; *The Right Hon. Lord Aberdare*, F.R.S.; Sir Rutherford Alcock, K.C.B.; General Sir J. H. Lefroy, B.A., K.C.M.G.; Major-General Sir H. C. Rawlinson, K.C.B.; General R. Strachey, B.E., F.R.S. *Treasurer*: Reginald T. Cocks, Esq. *Trustees*: Lord Houghton, D.C.L.; Sir John Lubbock, Bart., F.R.S. *Secretaries*: Clements R. Markham, Esq., C.B., F.R.S.; Douglas W. Freshfield, Esq. *Foreign Secretary*: Lord Arthur Russell, M.P. *Members of Council*: Sir Henry Barkly, G.C.M.G., K.C.B.; W. T. Blanford, Esq., F.R.S.; E. H. Bunbury, Esq.; Colonel J. U. Bateman Champain, R.E.; Major-General A. C. Cooke, B.E.; R. N. Cust, Esq.; Sir Barrow H. Ellis, K.C.S.I.; James Fergusson,

Esq., C.I.E., F.R.S.; Major-General Sir F. J. Goldsmid, K.C.S.I., C.B.; *Sir Joseph Hooker*, K.C.S.I., C.B., F.R.S.; W. Mackinnon, Esq., C.I.E.; Admiral Sir F. L. M'Clintock, F.R.S.; *E. Delmar Morgan, Esq.*; Rear-Admiral R. C. Mayne, C.B.; Cuthbert E. Peek, Esq., F.R.A.S.; Sir Rawson W. Rawson, K.C.M.G.; S. W. Silver, Esq.; General Sir C. P. Beauchamp Walker, K.C.B.; *Sir Thomas F. Wade*, K.C.B.; Capt. W. J. L. Wharton, R.N.; *General J. T. Walker*, C.B., F.U.S.

THE ANNIVERSARY DINNER.

The usual Annual Dinner of Fellows and their friends took place the same evening at 7 P.M., at Willis's Rooms, St. James's; Lord Aberdare, the retiring President, being in the chair. Among the guests and Fellows present on the occasion were the following:—

The Marquis of Lorne, the newly-elected President of the Society, the Maharajah of Johore, Prince Ghika, Roumanian Minister, Lord Houghton, General Sir Peter Lumsden, Lord Mark Kerr, Lord Egerton de Tatton, Mr. H. M. Stanley, Sir Thomas Brassey, M.P., M. Paul Lessar, Lord Colchester, Sir Henry Rawlinson, Sir Rutherford Alcock, the Hon. R. H. Meade, Mr. J. G. Kennedy, of the St. Petersburg Legation, Sir U. Kay-Shuttleworth, Colonel J. A. Grant, Mr. W. Mackinnon, General Sir J. Hills-Johnes, Sir Rawson W. Rawson, Sir Charles Tupper, High Commissioner for Canada, the Hon. G. A. Lloyd, of Sydney, General Sir F. J. Goldsmid, Sir Gerald Fitzgerald, Sir Arthur Phayre, Commander Chadwick (United States Navy), Mr. Bosworth Smith, Mr. H. H. Johnston, Mr. I. Lowthian Bell, Mr. Van Campen (of New York), Mr. Deans Cowan, Mr. W. D. James and Mr. F. L. James, Mr. Henniker Heaton.

The toasts were:—1. Her Majesty the Queen, Patron of the Society; H.R.H. the Prince of Wales, Vice-Patron; H.R.H. the Duke of Edinburgh, Hon. President, and the rest of the Royal Family; proposed by the President. 2. "The Medallists of the year," by the President. 3. "The Visitors," proposed by Lord Houghton. 4. "Our Retiring President," proposed by Sir Rutherford Alcock; this was briefly acknowledged by Lord Aberdare, who proposed the last toast, 5. "Our New President."

LORD HOUGHTON, in proposing the health of "The Visitors," coupled with it the names of Sir Peter Lumsden and Mr. H. M. Stanley. Referring to the presence of the Maharajah of Johore, his Lordship observed that on the left of the President sat one of those representatives of the East, who, to English politicians, were infinitely important as representing the unique fact of England being the only country in Europe which had exercised over the East at once sovereignty of protection with amity. Of Sir Peter Lumsden he could only say that he was at present perhaps the most interesting man in England, and it was very unsatisfactory to have to say that and yet to be able to say so little about him. He had been engaged as a kind of political theodolite in the remote regions on the boundaries of Turkomania and Afghanistan. A friend in the House of Lords suggested that he might tell Sir Peter Lumsden that he ought to be very happy to find himself even in Willis's Rooms after having passed so long the life of a *chamois* among the hills of Afghanistan, under the rifles, not of the mere material *chasseurs*, but of English politicians and journalists. To Mr. Stanley, a very old friend, whose genius he had hailed with delight the moment he knew him, he offered a warm welcome.

SIR PETER LUMSDEN, expressing his appreciation of the unexpected honour which had been conferred upon him of having his health drunk by such an assembly as the Royal Geographical Society, added that as a soldier he had little or nothing to do with politics, and he knew but little about the political theodolite which Lord

Houghton had so humorously and graphically described, but those who had been associated with himself would, he trusted, shortly lay before that Society the products of their labours with another theodolite, and he believed that they would realise the amount and value of the work done by Holdich, Gore, Talbot, and Peacocke, and the difficulties they had experienced in carrying out operations equalling, if not surpassing, in importance any which had been performed by any other engineers or officers. He was glad to have that opportunity of expressing his thanks to those officers for what they had done, as he felt confident this Society would hereafter do when the results of their labours were laid before it.

Mr. H. M. STANLEY, who was loudly cheered and called upon to speak, in returning thanks for the compliment paid to the visitors, said he had already promised various people to establish a church on the Congo; and he might promise the Royal Geographical Society, or any of its members, if not such splendid hospitality as they were able to show their guests, at least as hearty a welcome.

The Marquis of LORNE, who was heartily received on rising to respond, referring to the duties of the President of this Society, said he was very happy to think that the first request he had had to make in his quality of presumptive president, to any distinguished man, was the request to Sir Peter Lumsden to give them the benefit of his great geographical experience by reading a paper at the next Evening Meeting of the Society, a request which Sir Peter had readily complied with.

The company soon afterwards separated.

NEW GEOGRAPHICAL PUBLICATIONS.

(By J. SCOTT KELLIE, *Librarian R.G.S.*)

EUROPE.

Bent, J. Theodore.—The Cyclades; or Life among the Insular Greeks. London, Longmans & Co., 1885: post 8vo., pp. xx. and 501, map. Price 12s. 6d.

This volume forms a valuable addition to our knowledge of this interesting group of islands. The author, in company with his wife, passed two winters among the islanders of the Cyclades, for the purpose of studying Hellenic archaeology and folklore, and also for investigating old manners and customs, for which these islands offer plenty of scope. The results of these researches form the principal features of the volume which also contains a full account of each island visited. The addition of an index would have added to the value of the work.

Marinelli [Prof.] Giovanni.—Materiali per L'Altimetria Italiana. Serie VIII. Saggio di Altimetria della regione Veneto-Orientale e paesi confinanti tra il Piave, il Dravo, l'Isonzo e il Mare. I° Supplemento al "Cosmos di Guido Cora." Torino, 1884, pp. 187.

We have here the heights of 2768 localities in the eastern Venetian region computed from 3864 measurements, mostly original, by Professor Marinelli, and arranged in order according to districts. The full index facilitates reference.

Tromholt, Sophus.—Under the Rays of the Aurora Borealis: In the Land of the Lapps and Kvens. Original edition. With a map and 150 illustrations, portraits, diagrams, &c., from photographs and drawings by the author. Edited by No. VII.—JULY 1885.] 2 K

Carl Siewers. Two vols. Vol. i., pp. xv., 288; vol. ii., pp. x., 306. London, Sampson Low & Co., 1885. Price 30s.

Dr. Tromholt established himself during 1882-3 at Koutokaeino, on the river Alten, on the borders of Tromsø and Finnmarken Amts, and a little north of the Finland frontier, for the purpose of making continuous observations on the aurora borealis. Similar observations were carried on in co-operation with Dr. Tromholt, at the International Polar observing stations at Bossekop at the mouth of the Alten on the north, and at Sodankyla, in Finland, on the south-east. These combined observations have been of the first importance in shedding light on the real nature and cause of the aurora, and therefore the well-illustrated section of this work relating to Dr. Tromholt's observations and his investigations in connection therewith, are a valuable contribution to a section of physical science which has important relations with geography. Descriptions are given of several of the displays witnessed by Dr. Tromholt, and one chapter, 96 pages, is devoted to the subject in its various aspects. The bulk of the work, however, is devoted to details of the author's journeys and adventures among the Lapps, and to his observations of the daily life of these people. Although much has already been written about the Lapps from the days of Linnæus downwards, Dr. Tromholt supplements considerably what is known, and affords additional insight into the character and habits of this curious people. He went much about even in winter, and is therefore able to give us a striking idea of the country during that season, and some precise notions as to how the Lapps spend their time then. He also discusses the Lapp question generally in the light of previous knowledge and his own observations. His chapter on the reindeer is of considerable interest. Under the heading the "Reign of Terror in Lapland" Dr. Tromholt describes a period of violent religious excitement which prevailed in Lapland about forty years ago. He visited the stations both at Bossekop and Sodankyla, and gives some idea of the operations there. He also made a coasting voyage along the north coast from Hammerfest to Vadsø and into Russian Lapland. His book on the whole will remind the reader of Du Chaillu's 'Land of the Midnight Sun.' It abounds in spirit, indeed the author is often unnecessarily excited. The translation is frequently not quite so idiomatic as it might have been. There are many good and appropriate illustrations, and a useful map of northern Sweden and Finland to illustrate the author's journeys, 30 miles to an inch.

ASIA.

Bonaparte, Prince Roland.—*Les Recents Voyages des Néerlandais à la Nouvelle-Guinée.* Versailles, imprimé pour l'auteur. Mars, 1885, pp. 16.

This is a supplement to the record of Dutch voyages on the New Guinea coast by Prince Roland Bonaparte already noticed. It refers to the two voyages of Mr. Van Braam Morris in August-September and December 1883, and a third in July-August 1884. The first voyage was along the north coast of Dutch New Guinea, the second to MacLuer Gulf, and the third to the mouth of the Amberno. There are new maps of the north coast from west of Walckenac Bay to Humboldt Bay, and of the mouth of the Amberno.

— *Les Premières Nouvelles concernant l'Eruption du Krakatau en 1883, dans les journaux de l'Insulinde.* Paris, Imprimerie Ch. Maréchal et J. Montorier, 1884, pp. 23.

This is a methodically arranged series of first notices of the Krakatau eruption in the various journals published in the islands of the Malay Archipelago and the Indian Ocean. It is compiled by Prince Roland Bonaparte from information furnished by M. Diebrech of Samarang (Java). There is a map (1:200,000) with insets showing the part of the coast destroyed by the waves.

— *Les Premiers Voyages des Néerlandais dans l'Insulinde (1595-1602).* Versailles, Imprimerie de E. Aubert, 1884, pp. 39.

This is a reprint from the 'Revue de Géographie,' and is an extract from the preface of a work on the populations of the Indian Archipelago, which will shortly appear. Map of Indian Archipelago, scale 1:18,000,000.

Colquhoun, Archibald Ross.—Amongst the Shans. With an Historical Sketch of the Shans by Holt S. Hallett. Preceded by an Introduction on the Cradle of the Shan race, by Terrien de Lacouperie. London, Field and Tuer, &c., 1885: 8vo., pp. lv. and 392, maps and illustrations. Price 21s.

Much interest of a commercial nature is attached to this work, as it deals with the author's views on the practicability of constructing a line of railway that would connect the British Burma system with Zimmé and Bangkok, thus opening up Siam and the Shan States to commerce. Mr. Colquhoun accompanied the Government of India Mission to Zimmé in 1879, and the volume deals with the country between Bangkok and Zimmé, and contains the result of the author's observations on the manners and customs of the people, the physical features of the country as well as its products, together with much information obtained from previous writers. The introduction by Prof. Terrien de Lacouperie is a paper of great ethnological importance, as it traces the Shans back to their original seat in China Proper. The supplementary chapters by Mr. Holt S. Hallett are of purely historical interest.

Forbes, Henry O.—A Naturalist's Wanderings in the Eastern Archipelago; a Narrative of travel and exploration from 1878 to 1883. With numerous illustrations from the author's sketches and descriptions by Mr. John B. Gibbs. London, Sampson Low and Co., 1885: pp. xix., 536. Price 21s.

This is a work which, in kind at least, may be compared to Darwin's "Voyage of the Beagle," Wallace's "Malay Archipelago," Bates's "Naturalist on the Amazons," and Moseley's "Challenger Notes." Mr. Forbes visited several of the islands familiar to the readers of Mr. Wallace's work, and modestly regards his notes as only an addendum to "that model book of travel." But whether Mr. Forbes's notes refer to previously visited islands or not, their value as contributions to geography and natural history in its widest sense cannot be overrated. His observations extend to all that comes in his way, and his contributions to ethnology especially are of much interest. There is quite enough of incident in the volume to render it attractive to the ordinary reader. Mr. Forbes's work is divided into six parts. Part I. treats of the Cocos-Keeling Islands, and his observations on the population of these ocean specks are of much interest, while his investigations, supplementary to those of Darwin, on coral reefs, are of high scientific value. Part II. deals with his journeys in Java—his sojourns at Genteng and Kosala in Bantam, and at Pangelengan in the Preanger regencies. Part III., occupying about 140 pages, gives an account of Mr. Forbes's researches in Sumatra—his sojourn in the Lampongs and the Palembang residency, the latter region, indeed, occupying nearly the whole of this part. In Part IV. he deals with the Moluccas and Timor-Laut, his observations on Timor-Laut especially being of much original value. Part V. is devoted to the island of Buru, and Part VI., about 100 pages, to Timor. The appendices to the various parts of the work will be of great service to the scientific specialist. In the Appendix to Part I. we have (1) a list of Keeling atoll plants, pp. 42-3; (2) a list of the birds of the Keeling Islands, p. 44; and (3) a list of corals collected in the Keeling Islands, pp. 44-47. In the Appendix to Part II. are—(1) Description of a new bat from Java, of the genus *Kerivoula*, by Oldfield Thomas, F.Z.S., p. 118; (2) A new genus of spider, by the Rev. O. P. Cambridge, pp. 119-121. In Appendix to Part III. we have (1) The Osteological Characters of the Kubus of Sumatra, by Dr. J. G. Garson, pp. 261-267; (2) List of the Birds of Sumatra, pp. 268-274; (3) Additions to the Insect fauna of Sumatra, pp. 274-277; (4) Additions to the Flora of Sumatra, 278-9. Appended to Part IV. we have (1) A paper on the Cranial characters of the natives of Timor-Laut, by Dr. J. G. Garson, pp. 340-53; (2) List of Plants from Timor-Laut, pp. 354-5; (3) List of the Birds of Timor-Laut, pp. 355-368; (4) On Mr. Forbes's Collection of Reptiles and Batrachians from the Timor-Laut Islands, by G. A. Boulenger, pp. 368-70; (5) The Coleopterous Insects collected by Mr. Forbes in the Timor-Laut Islands, by C. O. Waterhouse, pp. 370-5; (6) The Lepidoptera collected by Mr. Forbes in

Timor-Laut, by A. G. Butler, pp. 375-380; (7) The Hymenoptera and Diptera, by W. F. Kirby, pp. 380-2; (8) The Crustacea, by E. J. Miers, pp. 382-3; (9) Vocabulary of words used in the Ké Islands and in Ritabel, Larat, Timor-Laut Islands, pp. 333-7. In Appendix to Part V. are (1) List of the Birds of Buru, pp. 409-10; (2) Description of a new species of *Tanaris*, p. 411; and (3) Some Buruese words, p. 411. Lastly, to Part VI. we have the following Appendices:—(1) Names of the Months in Timor, p. 489; (2) Dialects spoken in Eastern Timor, p. 490; (3) Vocabulary of three Timor dialects, pp. 491-5; (4) A New Species of Coleoptera of the family Cetoniidæ from Eastern Timor, by O. E. Janson, p. 496; (5) List of the organisms found adhering to three anchors dredged up from the Bay of Manado, Celebes, by S. O. Kidley and J. J. Quelch, p. 496; (6) *Prodromus Floræ Timorensis*, pp. 497-523. The index is fairly full, though for a book of such rare quality nowadays, and so abounding with details on everything observable, it might with advantage have been even more minute. The illustrations are numerous and instructive, though the process employed does not seem well suited for delicate work. There is one beautifully coloured illustration of Mrs. Forbes's Honey-eater, *Myzomela Annabellæ* Sci. There are a map of the Eastern Archipelago, 180 miles to 1 inch; map of the Keeling Islands, exhibiting the changes which have taken place since 1836; map of South Sumatra 30 miles to an inch; map of Tenimber Islands or Timor-Laut, 25 miles to an inch; small sketch map showing the relations of the Tenimber group; Krakatau before and after the eruption of August 1883, taken from the Proc. R.G.S. It is only at long intervals that we have the good fortune to come across so rich a record of five years' work. It is one of those books that become scientific classics, and is a guarantee of the harvest that may be expected from the expedition on which its author has just entered.

Lansdell, Henry [D.D., F.R.G.S.]—Russian Central Asia, including Kuldja, Bokhara, Khiva, and Merv. Frontispiece, Maps, and Illustrations. Two vols. Vol. i., pp. xxxii., 684; vol. ii., pp. xvi., 732. London, Sampson Low & Co., 1885. Price 42s.

These two great volumes are the results of six months' travel in the second half of 1882. It must not be thought, however, that Dr. Lansdell professes to have seen all that he records in these 1400 pages. He certainly managed to get over a great deal of ground in his 120 travelling days—12,145 miles—and of course saw much on his route, that forms the nucleus around which he has grouped a great variety of information gleaned from many sources not accessible to the ordinary or even extraordinary English reader. His route was from London by St. Petersburg, Moscow, Nijni-Novgorod, and Ekaterineburg, to Tiumen; thence to Omsk, Semipolatsinsk, and Kulja; from Kulja to Vierny, Tashkend, Khokand, and Samarkand; thence by Karshi to Bokhara; from Bokhara to Charjui, Petro-Alexandrovsk, Khiva, Kunia Urgenj, Krasnovodsk, and Baku; from Baku to Tiflis, and home by Odessa. About all the places he visited he has something to tell that will be of service to the geographer who desires to know the present condition of these remote parts. Dr. Lansdell is a favourite with the Russian Government, and so obtained unusual facilities for seeing all that is worth seeing. He also found favour in the eyes of the potentate of Bokhara, and the record of his stay in that country is one of the most interesting passages in his book. But Dr. Lansdell has put himself to much trouble to bring together in methodical form much useful geographical and scientific information concerning Central Asia, which will make his work of permanent value as a book of reference. A chapter is devoted to an account of what is usually regarded as "Russian Central Asia." Three chapters deal with the Province of Semipolatsinsk, its natural features, economy, and administration. Another chapter is devoted to an historical sketch of the Russian occupation of the Irtish. In this chapter a full account is given of the province of Semirechia, while a third treats of the Russian occupation of the province; and a brief stay at Kulja suggests a chapter on the ethnology and ethnography of the Ili valley. Three chapters deal with

the Kirghese. In succeeding chapters we have accounts of the Syr-Daria Province, and of the Russian advance therein; the Amu-Daria Province, Tashkend, Ferghana, Zarafshan, Samarkand, and the Russian occupation of Turkistan. The three concluding chapters of vol. i. deal with Russian prisons, and are succeeded by tables of the chronology of Russian Central Asia, and Central Asian money, weights, and measures. In vol. ii., five chapters are devoted to Bokhara, and other special chapters to Charjui, the Upper Oxus, Petro-Alexandrovsk, and the Lower Oxus, Khiva (three chapters), Sary Kamish and the old bed of the Oxus, Turkmenia, the Russian advance to Merv, and Merv as annexed. Into 180 pages of Appendices has been collected much precise information of great scientific value from the works of eminent Russian naturalists, in the arrangement of which Dr. Lansdell has been assisted by well-known specialists. There are lists of Mammals, pp. 515-6; Birds, pp. 517-27; Reptiles, pp. 528-9; Amphibia, p. 529; Fishes, pp. 530-36; Molluscs, pp. 537-43; Spiders, pp. 543-7; Crustacea, pp. 548-51; Coleoptera, pp. 552-61; Mellifera, pp. 562-67; Sphegidae, &c., pp. 568-71; Scoliidæ, pp. 572-74; Mutillidæ, p. 575; Formicidæ, 576-8; Chrysidiiformes, pp. 579-80; Lepidoptera, pp. 581-608; Neuroptera, pp. 610-12; Orthoptera, pp. 613-15; Vermes, pp. 615-17. The flora of Russian Central Asia occupies pp. 619-53; while to a valuable Bibliography pp. 654-80 are devoted. The index is very full and complete. There are numerous excellent illustrations; map to illustrate the author's route, and an ethnological map, both about 100 miles to an inch.

Man, Edward Horace.—On the Aboriginal Inhabitants of the Andaman Islands pp. xxviii., 224. With Report of Researches into the Language of the South Andaman Islands, by A. J. Ellis, F.R.S., F.S.A., pp. 31. Reprinted from the Journal of the Anthropological Institute of Great Britain and Ireland. London, Trübner & Co. [1885].

Students of anthropology are no doubt already acquainted with Mr. Man's extremely valuable contribution to a knowledge of the Andaman Islanders,—one of the most interesting groups of humanity from a scientific point of view—as they appeared in successive parts of the Journal of the Institute for 1882-3. As Mr. Man resided in the islands during 1869-80, and for four successive years had charge of the "Homes" erected by Government for the aborigines, he had exceptional advantages for studying the people. These advantages he knew how to make use of, and at the same time to exercise the greatest caution in sifting his information and testing it by information derived from other sources. The Council of the Anthropological Institute have therefore done a service to science, to geography as well as to anthropology, in reproducing Mr. Man's paper in a form that will be easily accessible to all interested in the subject. The memoir is really a complete study of the islanders in all aspects, from their form and size down to their games and amusements. The photographs and illustrations of implements, weapons, and other objects add much to the value of the memoir. There are, moreover, upwards of 40 pages of Appendices containing much special information of scientific utility. Mr. Ellis's paper (his Address as President of the Philological Society in 1882) is appended with separate pagination and is a useful addition to the memoir.

Manzoni, Renzo.—El Yèmen, tre anni nell' Arabia Felice. Escursioni fatte dal Settembre 1877 al Marzo 1880. pp. vi., 446. Rome, Bolta; London, Trübner, 1884.

A record of several leisurely journeys in various directions throughout the south-west corner of Arabia. There are many very fine illustrations and the following maps and plans:—Large coloured plan of the town of Sanâa and the following maps and plans:—Large coloured plan of the town of Sanâa; map of Southern Yemen, 1:750,000; and general map of Yemen, by G. E. Fritsche, from all existing authorities, 1:1,000,000. Unfortunately there is no index.

[Punjab Gazetteers.]—Gazetteer of the Ambala District, pp. iv., 82, and xxvii.; Dera Ismail Khan District, pp. 12, 213, and xxvii.; Ferozepore District, pp. v.,

102, and xxiii.; Gujranwala District, pp. v., 92, and xxv.; Gurdaspur District, pp. iv., 108, and xxiv.; Gurgaon District, pp. v., 150, and xxvi.; Hazara District, pp. ix., 213, and xxiv.; Hisar District, pp. iii., 75, and xxiii.; Hoshiarpur District, pp. v., 159, and xxiv.; Kangra District. Vol. 1.—Kangra Proper, pp. x., 257, and xxviii. Vol. 2.—Kulu, Lahaul, and Spiti, pp. viii. and 153; Karnal District, pp. viii., 273, and xxiv.; Lahore District, pp. x., 201, and xxvii.; Rawalpindi District, pp. vii., 131, and xxvii.; Sialkot District, pp. v., 111, and xxv. 1863-4. Compiled and published under the authority of the Punjab Government; the 2nd, 5th, 6th, 8th, and 12th, Lahore (Arya Press); the rest, Calcutta (Central Press Co.): 8vo.

Previously issued volumes of this set are noticed in the 'Proceedings' for January at p. 54. For the above-mentioned 15 volumes the Society is indebted, as before, to the liberality of H.M. Secretary of State for India in Council. Each volume, as previously, is divided into six parts:—The District, History, the People, Production and Distribution, Administration and Finance, Towns, Municipalities and Cantonments.

AFRICA.

Aschersen, P.—*Bemerkungen zur Karte meiner Reise nach der Kleinen Oase in der Libyschen Wüste.* Zeitschrift der Gesellschaft für Erdkunde zu Berlin, No. 116, pp. 110-160.

The map, which extends from the Nile to the Lesser Oasis and includes on the north Birket-el-Qerūn, is on the scale 1:500,000. There are insets of the north part of the Lesser Oasis on the scale 1:145,000, and of the district of Baniti to three times the scale of the large map. Herr Aschersen gives a list of his previous publications on the journey which he made in the spring of 1876; a sketch of the geology of the region, and a brief account of the work of previous explorers; a minute topographical sketch of the oasis and its districts; a list of the plants discovered by him; and a list of the stations on the Upper Egyptian railway, with distances.

Cameron, Verney Lovett.—*Across Africa.* New edition. London, G. Philip & Son, 1885, 8vo., pp. xxviii. and 569, map and illustrations. Price 12s. 6d.

Although ten years have nearly elapsed since Commander Cameron's return home from his memorable journey across Africa, this new edition of his work may still prove of value to students of African geography and those interested in the opening up of Africa to civilisation and commerce, as it covers so much ground that has never before or since been penetrated by any other white man. It contains additional chapters relating to recent events in Africa, including those of political and commercial importance, also remarks on the Lukuga outlet of Tanganyika. The map, on a scale of 74 miles to the inch, has been corrected, and shows the author's route.

Stanley, Henry M.—*The Congo and the Founding of its Free State. A Story of Work and Exploration.* Two vols., with 122 full-page and smaller illustrations, two large maps and several small ones. Vol. i., pp. xxvii., 528; vol. ii., pp. x., 483. Price 42s.

These long hoped-for volumes are what their title implies—mainly a record of the operations involved in founding the series of stations on the Congo between Vivi and Stanley Falls, which at present are the outward and visible signs of the "Free State" that has been established by the far-seeing enterprise of the King of the Belgians and the indomitable energy of Mr. Stanley. In describing these operations and telling the story of the various stages of advance up the river, Mr. Stanley necessarily gives many details which will be of use to the geographer. But the geographical information is not so copious as might have been desired; and indeed, considering the object of the work and the aims which Mr. Stanley had in view in ascending the Congo, the geography of the river is necessarily a secondary consideration. The first four

chapters are devoted to the history of the Congo and Congo-land, the negotiations which took place after Mr. Stanley's arrival from his previous memorable journey across the continent, and to the history of the International African Association. These, as well as other matters connected with the Congo Free State, we have recently referred to in some detail. Chapters v. to viii. are occupied with the organisation of the expedition at Zanzibar, the voyage thence by the Red Sea and the Mediterranean to the mouth of the Congo, and up the river to Vivi, which was reached on September 27th, 1879. Mr. Stanley having decided to locate his first station here, lost no time in clearing the platform of grass and bush, arranging a suitable landing-place, and erecting his first houses. He enters in considerable detail into the operations undertaken in connection with the station, the arrangements made with the chiefs, and the first attempts at road-making, which gained for him the name by which he is known all along the river—*Bula Matari*, the "rock-breaker." The succeeding chapters, x. to xxx., are occupied with the interesting story of progress up the river from one station to another, until at last Stanley Falls were reached, and the remotest station established there in the beginning of December 1883, little more than four years after the arrival at Vivi. All this was not accomplished without many difficulties and even risks. The founding of Leopoldville, at Stanley Pool, especially, involved much tedious negotiation, and required all Mr. Stanley's tact and experience to avoid a rupture and even a collision with the natives. But throughout the enterprise the native chiefs showed themselves wonderfully ready to welcome the man whom some of them at least did their best to "eat up" on his previous hazardous voyage down the river. Mr. Stanley himself suffered severely on more than one occasion from fever; indeed, once at least he was as near death as Mr. Thomson was in Masai Land, and any one with less of an iron frame would have succumbed. In the middle of 1882 he returned to Europe to recruit. It was just previous to this that he discovered Lake Leopold II., which discharges on the left bank by the Muni and Kwa nearly opposite the Lawson. The account of the exploration of the lake is full of interest, and a fair idea is afforded of the nature of the country on its banks. Mr. Stanley joins it conjecturally with Lake Mantumba on the north, the latter being really a backwater of the Congo. We hope this suspected connection will be investigated, as, if established, it will be a hydrographical phenomenon of much interest. Mr. Stanley still persists in connecting the Aruwimi with the Welle, and so extends the Congo basin up to 8° N. latitude. Let us hope that Dr. Lenz will be able to set this much disputed point at rest. The concluding chapters are occupied with an account of what Mr. Stanley believes to be the commercial resources of the Free State, its suitability for European settlement, its possible trade, and the advantages of a railway to bridge the impassable cataracts on the lower river. He estimates the population of the Middle Congo basin at 43,000,000, much too high an estimate, we fear. His remarks on the climate of the Congo and the precautions necessary for Europeans who wish to keep their health, are of great utility. Estimates are given of the uninterrupted navigation of the Congo and its tributaries from Leopoldville to Stanley Falls, 5249 miles; as also of the lengths of the various rivers and their principal tributaries which fall into this section of the Congo. The last chapter is occupied with an account of the Congo Conference. The many illustrations afford a good idea of the scenery on the Congo, the aspect of several of the stations, and the physique of the various types of natives. There is a large map of the Congo basin and adjacent territory on the scale of 45 miles to an inch. The smaller maps are the Congo from Banana to Vivi, 5 geographical miles to an inch; sketch map of Vivi station, $\frac{1}{2}$ statute mile to an inch; sketch map of Stanley Pool, 5 geographical miles to an inch; and a small outline map, showing political divisions of the Congo Basin.

Zöller, Hugo.—Das Togo-land und die Sklaven-Küste. pp. 247. Berlin and Stuttgart, Spemann (London, Dulau). Price 5s.

Herr Zöller has visited the recently annexed district of Togo-land, in the Bay of Benin, and sent an account of his journey from Hamburg to the Slave

Coast to the *Kölnische Zeitung*. This appears to be, in the main, a reprint of these communications, and is useful as containing a full account of the actual condition of this recent German annexation. There are several illustrations, a page map of the West African Coast, and a page map of Togo-land.

AMERICA.

Derby, Orville A.—Physical Geography and Geology of Brazil. pp. 13. Rio de Janeiro, Lamoureux & Co., 1884.

This is an English reprint of Mr. Derby's contribution to Abreu and Cabral's 'Brazil Geographico e Historico'; and as Mr. Derby has for years made the geology of Brazil a special study on the spot, it may be accepted as one of the most trustworthy general accounts of the subject that we have, of recent date.

Laërne, K. F. Van Delden.—Brazilie en Java, Verslag over de Koffiecultuur in Amerika, Azië en Afrika. pp. xviii., 626. S'Gravenhage, Martinus Nyhoff, 1885.

This is a publication of the well-known Institute of the Dutch East Indies, and contains a great amount of well-arranged and carefully sifted information on coffee-culture in Brazil and Java, and on the coffee-trade of the chief coffee dealing countries of the world. The work, at the same time, contains much useful information on the geography, climate, industries, and social condition of Brazil, and it is a pity that it has not been written in a language more generally accessible. Appended are two maps—one, general, of the coffee area of Central Brazil by M. van Delden Laërne (1:1,000,000), and another of the geology of the coffee area of Central Brazil (1:1,000,000) by Prof. O. A. Derby.

[**Mexico**].—Cuadro Geográfico, Estadístico, Descriptivo e Histórico de los Estados Unidos Mexicanos. Obra que sirve de texto al Atlas Pintoresco de Antonio Garcia Cubas. Mexico, Oficina Tip. de la Secretaria de Fomento, 1885, pp. iv., 473, iii.

This is a well-arranged and useful collection of statistical and other information concerning Mexico, published under official sanction, and edited by M. Garcia Cubas, whose excellent atlas of Mexico is well known. There is, first, geographical and administrative information, followed by sections on ethnography, ecclesiastical affairs, ways of communication, foreign commerce, public instruction, orography, hydrography, agriculture, mining, history. Special chapters are devoted to the State and City of Mexico.

Mulhall, M. G. and E. T.—Handbook of the River Plate: comprising the Argentine Republic, Uruguay, and Paraguay. Fifth edition. Buenos Ayres, M. G. and E. T. Mulhall; London, Trübner & Co., 1885. Post 8vo., pp. x. and 732, maps. Price 7s. 6d.

This edition is entirely new, and contains much useful information on the geography and general resources of the Argentine Republic, Uruguay, and Paraguay. In the Appendix is contained, besides notes on miscellaneous subjects, a description of the Ocampo (sugar) Colony founded a few years ago by Mr. Ocampo Semanés in the Southern Chaco and which has gradually grown into magnitude. It also contains Directories of Buenos Ayres City and Province, Rosario, the Provinces, and the cities of Tucuman and Montevideo. The volume is illustrated by six maps.

Polakowsky, [Dr.] H.—Die Neuesten Reisen zur Durchforschung von Costa Rica. 'Petermann's Mitteilungen,' vi., 1885.

Dr. Polakowsky here gives a sketch of numerous journeys to all parts of Costa Rica by Dr. Thiel, the Bishop of that country, from 1881 to 1884. The

narrative contains much useful and fresh information on the topography and ethnography of Costa Rica, the bishop having made a special study of the dialects spoken among the Indians.

ARCTIC.

Schley [Commander] W. S., and Soley [Professor] J. R.—The Rescue of Greely. Illustrated from the Photographs and Maps of the Relief Expedition. pp. vi., 277. London, Sampson Low & Co., 1885. Price 12s. 6d.

This is a clear and complete account of the three attempts to relieve the unfortunate Greely party. The two first attempts, organised by the United States military authorities, and strangely commanded by military officers, were unsuccessful; the third attempt, carefully organised by Commander Schley, and in which the *Alert* took part, was only just in time to rescue the last six survivors at Cape Sabine. In two preliminary chapters the authors give a sketch of the Baffin's Bay route, and of the Circumpolar Station scheme. A third chapter is devoted to the Lady Franklin Bay Expedition under Lieutenant Greely, its equipment and establishment at Fort Conger. Then follow accounts of the failures of 1882 and 1883 in the *Neptune* and *Proteus*; details of the steps taken to organise a third relief expedition, and a minute and business-like narrative of the operations which ended in the rescue. There are a portrait group of the six survivors, and several very good Arctic illustrations. The maps are Smith Sound, showing Cape Sabine and Littleton Island; Track Chart of Commander Schley's expedition, in three sections; and a large map, issued by the United States Hydrographic Office, of the regions north of Baffin's Bay, showing the discoveries from the *Polaris* expedition down to that of Lieutenant Greely.

Verslag van den Zevenden Tocht van de *Willem Barents* naar de Noordelijke Ijszee in den Zomer van 1884. Uitgebracht aan het Bestuur der Vereeniging Willem Barents. Haarlem, Willink, 1885, pp. 66.

This is an official account of the work done by the *Willem Barents* on her seventh cruise in the Spitzbergen-Novaya Zemlya waters in June to October 1884. There is a large chart showing her course, with an inset map of Matotschkin Scharr.

WORLD.

Dilke, [Sir] Charles Wentworth.—Greater Britain: a Record of Travel in English-speaking Countries. Eighth edition. With Additional Chapters on English Influence in Japan and China, and on Hong Kong and the Straits Settlements. London, Macmillan & Co., 1885, cr. 8vo., pp. x. and 633, illustrations. Price 6s.

The author's journeys were undertaken in 1866 and 1867, during which he states "I followed England round the world." The first edition of this work was published in 1868. In the present edition the earlier portions of the work have not been changed otherwise than by certain statements having been omitted which had ceased to be true and by the addition of a few notes. The volume is divided into four parts as follows:—Part I. America. Part II. Polynesia. Part III. Australia. Part IV. Asia. The additional chapters form the record of one of the author's later journeys undertaken in 1874–75.

GENERAL.

Blanchard, E.—De la dissémination des espèces végétales et animales. Comptes Rendus de l'Académie des Sciences, No. 23, 8 Juin, 1885. La Connaissance des flores et des faunes dans ses applications à la Géographie et à l'histoire du globe. Id., No. 24, 15 Juin, 1885. Paris, Gauthier-Villars.

These are papers of considerable importance on the subject of the geographical distribution of plants and animals. M. Blanchard laments the want of information as to the precise geographical limits of the various species, and points

out that we are comparatively ignorant of the laws which regulate distribution. He then proceeds to indicate some of the influences at work in this direction, temperature being, of course, one of the most potent. Other influences are the hygrometric state of the atmosphere, the quantity of insolation, chemical composition of the soil, and other causes more or less obscure. M. Blanchard illustrates the influences of various causes by numerous instances both from the animal and vegetable world. In the second paper the author points out the great importance to geography of the leading features which characterise the animal and vegetable life of a region.

Suess, Eduard.—*Das Antlitz der Erde. Mit Abbildungen und Kartenskizzen. Erstes Band.* Prag, F. Tempsky; Leipzig, G. Freytag; London, Trübner: 1884-5, pp. iv., 778. Price 26s.

This is a work which will take a first place in physical geography, its object being to show the various forces and processes at work to modify the face of the earth. It is divided into four sections. The first deals with the changes in the outer rock-forms of the earth; the second with the mountains of the earth; the third with the changes in the condition of the surface of the ocean; and the fourth with the face of the earth as a whole and in its various aspects. The first volume is occupied with the first two sections. After an introduction the successive chapters of the first section deal with the deluge; various earthquake regions; dislocations; volcanoes; various kinds of oscillations. The second section, on the mountains of the earth, includes chapters on the northern spurs of the Alpine system; the chief lines of that system; the Adriatic trough; the Mediterranean; the great deserts; the broken-up Indian Continent ("Lemuria"); the Indian groupings; the relations of the Alps to the Asiatic Mountains; South America; the Antilles; North America; the Continents. The illustrations, consisting of numerous special views and sketch-maps, are excellent.

The following works have also been added to the Library:—

Africa. No. 4 (1885). *Protocols and General Act of the West African Conference.* London, printed by Harrison & Sons, folio, pp. 313.

Foxe [Captain] Luke.—North-west Fox, or, Fox from the North-west passage. Beginning with King Arthvr, Malga, Oethvr, the two Zeni's of Iseland, Estotiland, and Dorgia; following with briefe Abstracts of the Voyages of Cabot, Frobisher, Davis, Waymouth, Knight, Hudson, Button, Gibbons, Bylot, Baffin, Hawkrige: Together with the Courses, Distance, Latitudes, Longitudes, Variations, Depths of Seas, Sets of Tydes, Currents, Races, and over-Falls; with other Observations, Accidents, and remarkable things, as our Miseries and sufferings. Mr. James Hall's three Voyages to Groyndland, with a Topographically description of the Countries, the Salvages lives and Treacheries, how our Men have bene slayne by them there, with the Commodities of all those parts; whereby the Marchant may have Trade, and the Mariner Employment. Demonstrated in a Polar Card, wherein are all the Maines, Seas, and Ilands, herein mentioned. With the Author his owne Voyage, being the XVIth, with the opinions and Collections of the most famous Mathematicians, and Cosmographers; with a Probabilitie to prove the same by Marine Remonstrations, compared by the Ebbing and Flowing of the Sea, experimented with places of our owne Coast. By Captaine Lvke Foxe of Kingstone vpon Hull, Capt. and Pylot for the Voyage, in his Majesties Pinnace the Charles. Printed by his Majesties Command. London, Printed by B. Alsop and Tho. Fawcett...1635: sm. 8vo., pp. 270. [Map wanting.]

Grimes, J. Stanley.—*Geonomy: Creation of the Continents by the Ocean Currents. An advanced system of Physical Geology and Geography.* Philadelphia, J. B. Lippincott & Co., 1885: 12mo., pp. 116.

Lanier, Sidney.—Florida: its Scenery, Climate, and History. With an account of Charleston, Savannah, Augusta, and Aiken, and a Chapter for Consumptives; being a complete Hand-Book and Guide. Philadelphia, J. B. Lippincott & Co. [1875]: sm. 8vo., pp. 264.

Moxon, Joseph.—A Tutor to Astronomy and Geography. Or an easie and speedy way to know the Use of both the Globes, Cœlestial and Terrestrial. In Six Books. 1. Teaching the Rudiments of Astronomy and Geography. 2, 3, 4, 5, 6 (Shewing by the Globes the solution of) Astronomical and Geographical Problemes. Problemes in Navigation. Astrological Problemes. Gnomonical Problemes. Trigonometrical Problemes. More fully and amply than hath yet been set forth, either by Gemna Frisius, Metius, Hues, Wright, Blaew, or any others that have taught the Use of the Globes: And that so Plainly and Methodically, that the meanest Capacity may at first Reading apprehend it, and with a little Practice grow expert in these Divine Sciences. With an Appendix shewing the Use of the Ptolomaick Sphere. The Fourth Edition Corrected and Enlarged. Whereunto is added the Antient Poetical Stories of the Stars: shewing Reasons why the several Shapes and Forms are pictured on the Cœlestial Globe. As also a Discourse of the Antiquity, Progress and Augmentation of Astronomy. London. Printed by S. Roycroft...1686. Sq. 8vo., pp. 271, portrait and illustrations.

Rink, [Dr.] Henry.—Tales and Traditions of the Eskimo, with a sketch of their Habits, Religion, Language, and other peculiarities. Translated from the Danish by the author. Edited by Dr. Robert Brown. Edinburgh and London, W. Blackwood and Sons, 1875: 8vo., pp. xii. and 472, illustrations.

Van Campen, S. R.—The Dutch in the Arctic Seas. In two volumes. With illustrations, maps, and appendix. Vol. I. A Dutch Arctic Expedition and Route. Third edition. London, Trübner & Co., 1878: 8vo., pp. xxxvii. and 263.

NEW MAPS.

(By J. COLES, *Map Curator R.G.S.*)

EUROPE.

Baltic.—Map of the Basin of the —, with Map of Central Europe and Asia extending from the British Isles to India, and an enlarged Map of the Bosphorus. W. & A. K. Johnston, Edinburgh & London, 1885. Price 1s.

Bayerischen-Waldes.—Die Waldungen des —. Scale 1:450,000 or 6·2 geographical miles to an inch. Deutsche Geographische Blätter, Band VI. Wagner & Debes, Leipzig. (*Dulau.*)

Central-Europa.—Neue Uebersichtskarte von —, resp. der oesterreichisch-ungarischen Monarchie. Scale 1:750,000 or 10·3 geographical miles to an inch. Militär geograph. Institute, Wien. Sheets:—A 1. Cöln, Cassel, Hannover, Osnabrück, Fulda. Westl. A. Amsterdam, Haag, Flensburg, Memel. Westl. A. 1. Aachen, Brüssel, St. Quentin. F. 4. Galaz, Medžidie, Ismail, Silistria, Balčik. Price 2s. each sheet. (*Dulau.*)

Lübeck.—Karte von dem Fürstenthum, von Rodenberg. Scale 1:50,000 or 1·4 inch to a geographical mile. Hamburg. Price 5s. (*Dulau.*)

Oesterreichsch - Ungarischen Monarchie. — Specialkarte der —. Scale 1 : 75,000 or 1 geographical mile to an inch. K. k. militär-geografisches Institut, Wien, 1885. Sheets:—Zone 8, Col. XX. Ujsoly und Stara-Bistrica. 10, XVII. Ung. Ostra und Waag-Neustadtl. 10, XIX. Tót-Próna und Privigye. 11, XIX. Handlova und Oslány. 12, XVII. Tyrnau. 12, XVIII. Neutra. 12, XIX. Königsberg und Szt. Benedek. 12, XX. Schemnitz und Karpfen. 13, XVIII. Sellye und Nagy-Surány. 13, XX. Balassa-Gyarmat und Ipoly-Ság. 13, XXI. Salgó-Tarján und Szécsény. 14, XIX. Mgy. Szölgyén und Gran. 14, XXI. Pásztó und Apc. 14, XXIV. Polgár. 16, XVIII. Moór und Zirc. 17, XVIII. Veszprim und Palota. 18, XVIII. Balaton-Füred und Város-Ilidvég. 18, XIX. Sárbogárd. 20, XXVIII. Abrudbánya. 24, XXVI. Karánsebes und Resicabánya. 25, XVII. Svinjar und Oriovac. 35, XVII. Babinopolje. Price 1s. 4d. each sheet. (*Dulau.*)

Ungarn. — Administrativ - Wandkarte v. —. J. Hátsek. 6 sheets. Scale 1 : 500,000 or 6·8 geographical miles to an inch. Artaria & Co., Wien. (*Dulau.*)

ORDNANCE SURVEY MAPS.

Publications issued from 1st to 30th April, 1885.

1-inch—General Maps:—

IRELAND: Sheet 132 (with Hills). Price 1s.

6-inch—County Maps:—

ENGLAND AND WALES: Sheets: **Buckinghamshire:** 22; 2s. 6d. **Glamorganshire:** 8, 34; 2s. 6d. each. **Hertfordshire:** 21; 2s. 6d. **Oxfordshire:** 4; 2s., 27; 2s. 6d. Quarter sheets: **Bedfordshire:** 12 S.W.; 1s.; with contours, 15 N.E.; 22 S.E.; 1s. each. **Cornwall:** 21 N.W.; 1s. **Derbyshire:** 62 N.W. with 53 N.W. (Staffordshire); 62 S.W. with 53 S.W. (Staffordshire); 63 N.W. with 22 N.W. (Leicestershire) and 54 N.W. (Staffordshire); 1s. each. **Devonshire:** 17 S.W., 17 S.E.; 40 N.W.; 76 S.E.; 1s. each. **Gloucestershire:** 26 S.W., 26 S.E.; 57 N.E.; 1s. each. **Herefordshire:** 9 S.W., 9 S.E.; 14 N.W., 14 N.E.; 1s. each. **Leicestershire:** 23 N.W. with 64 N.W. (Derbyshire); 1s. **Montgomeryshire:** 23 S.E.; 29 S.W., 29 S.E.; 30 N.W., 30 N.E., 30 S.W., 30 S.E. with 46 S.E. (Shropshire); 48 S.E.; 1s. each. **Norfolk:** 35 N.W., 35 N.E., 35 S.W.; 40 N.W.; 77 S.E. with 1 S.E. (Suffolk); 85 S.W.; 106 S.E. with 16 S.E. (Suffolk); 111 N.W. with 26 N.W. (Suffolk); 1s. each; with contours, 85 N.W.; 1s. **Northamptonshire:** 11 S.E.; 12 S.W.; 17 N.E.; 22 S.E.; 23 N.W. with 54 N.W. (Leicestershire); 23 N.E., 23 S.W., 23 S.E.; 24 N.W., 24 N.E., 24 S.W.; 25 S.E.; 26 N.W., 26 S.W.; 33 S.W., 33 S.E.; 34 S.W.; 41 N.W.; 1s. each. **Nottinghamshire:** 14 S.W.; 15 N.E. with 59 N.E. (Lincolnshire); 15 S.W.; 23 N.W. with 31a N.W. (Derbyshire); 38 N.E.; 1s. each. **Rutland:** 9 N.W.; 13 N.E.; 1s. each. **Shropshire:** 25 N.E. with 10 N.E. (Montgomeryshire); 53 N.E. with 37 N.E. (Montgomeryshire); 1s. each. **Somersetshire:** 28 S.E.; 39 N.W., 39 N.E., 39 S.E.; 40 S.W.; 43 S.W., 43 S.E.; 55 N.W., 55 N.E., 55 S.W., 55 S.E.; 1s. each. **Suffolk:** 2 S.E. with 78 S.E. (Norfolk); 26 N.E., 26 S.W.; 36 S.E.; 37 N.W., 37 S.W., 37 S.E.; 46 S.W., 46 S.E.; 62 N.W., 62 N.E., 62 S.W., 62 S.E.; 76 S.E.; 81 S.W.; 1s. each. **Worcestershire:** 39 S.W.; (46 N.W., 46 N.E.); 47 N.E.; 54 N.W.; 1s. each.

25-inch—Parish Maps:—

ENGLAND: **Bedford:** Area Books of the following parishes:—Biggleswade, Bletsoe, Carlton, Colworth, Cockayne Hatley, Dean, Felmersham, Harrold, Knotting, Little Haughton, Melchbourne, Milton Ernest, Odell, Pertenhall, Ravenden, Riseley, Roxton, Shelton, Souldrop, Thurleigh, Wymington, Tilbrook, Yelden. **Bedford and Huntingdon** (Det., No. 2). **Everton.** **Cornwall:** Kilkhampton, 13 sheets; Launcells, 11; Linkinhorne, Area Book; Marhamchurch, 6; Moorwinstow, 4; Poughill, 5; Poundstock, 4; Stratton, 7; Week St. Mary, 3; Whitstone, 2. **Devon:** Ashwater, 1; Bea-

worthy, 1; Bickleigh, 1; Bradstone, 1; Bratton Clovelly, 2; Bridestowe, 1; Bridestowe and Sourton Common, 1; Broadwood Widger, 1; Buckland Monachorum, 2; Clawton, 1; Germansweek, 2; Halwill, 2; Holdsworthly, 2; Kelley, 1; Liffon, 1; Pancras Week, 1; Pyworthy, 1; Sourton, 1; Tamerton Foliot, 1; Thrushelton, 1; Walkhampton, 3. **Gloucester**: Admington, 1; Ashchurch, 1; Baunton, 1; Beckford, 1; Bisley, 2; Churchdown, 1; Cirencester, 1; Clifford Chambers, 1; Daglingworth, 1; Down Hatherley, 1; Duntisborne Abbots, 1; Duntisborne Rouse, 1; Edgeworth, 1; Ilmington, 1; King's Stanley, 1; Long Marston, 1; Minchinhampton, 3; Miserden, 1; Oxenton, 1; Painswick, 1; Pitchcombe, 1; Preston, 1; Preston upon Stour, 1; Quinton, 2; Rodborough, 2; Sapperton, 1; Stratton, 1; Twingworth, 1; Welford, 1; Weston upon Avon, 1; Woodchester, 1; Woolstone, 1; Wootton St. Mary Without, 1. **Huntingdon** (Det., No. 1): Swineshead, Area Book. **Monmouth**: Llangattock Juxta Carleon, Area Book. **Norfolk**: Ashby with Oby, 1; Billockby, 1; Buckenham Tofts, Ar. Bk.; Bunwell, Ar. Bk.; Burgh St. Margarets, 1; Carleton Rode, Ar. Bk.; Clippesby, 1; Feltwell, 1; Great Cressingham, Ar. Bk.; Gressenhall, Ar. Bk.; Houghton-on-the-Hill, Ar. Bk.; Little Fransham, Ar. Bk.; Ludham, 1 and Ar. Bk.; Martham, 1; Methwold, 1; Northwold, 1; Potters Heigham, 1; Reppe with Bastwick, 1; Rollesby, 1; Saham Toney, Ar. Bk.; Tacolneston, Ar. Bk.; Tibenham, Ar. Bk.; Weeting with Bromehill, 1; Wendling, Ar. Bk. **Nottingham**: Bilsthorpe, 1; Burton on Joyce, 1; Carlton, 1; Colwick, 1; Edingley, 6; Farnsfield, 5; Gedling, 1; Halam, 4; Holme Pierrepont, 1; Kirklington, 3; Lambley, 1; Oxtun, 1; Sneinton, 1; Southwell, 1; St. Mary, 1. **Stafford**: Blymhill, Ar. Bk.; Rugeley (Re-survey), Ar. Bk. Weston under Lizard, Ar. Bk. **Suffolk**: Akenham, 1; Bedford, 2; Brandon, 1; Brettenham, 1; Dennington, 2; Drinkstone, 1; Earl Soham, 1; Felsham, 1; Flempton, Ar. Bk.; Framlingham, 1; Framsdon, 1; Gedding, 13; Henley, 1; Hitcham, 1; Kettlebaston, 1; Kettleburgh, 1; Lakenheath, 1; Little Stonham, 1; Mickfield, 1; Petlaugh, 1; Preston, 1; Rattlesden, 1; Redisham, Ar. Bk.; Saxstead, 2; Stonham Aspell, 1; Swilland, 1; Tannington, 2; Winstone, 1; Witnesham, 1; Worlingworth, 1.

ASIA.

Indo-Chine Orientale.—Itinéraires de M. A. Pavie dans le sud-ouest de l' —, (Cambodge et Siam, 1880-1884). Carte publiée d'après les ordres de M. C. Thomson, gouverneur de la Cochinchine. Paris, Challamel aîné. (*Dulaud*.)

Iran.—Karte von —, Oestliche Hälfte, enthaltend Afghanistan, Balutschistan und die Ozbeglieschen Khanate am Oxus. Scale 1:3,000,000 or 41·6 geographical miles to an inch. H. Kiepert. Berlin, D. Reimer. Price 2s. (*Dulaud*.)

AFRICA.

Angola.—Carte de —. Contendo indicações de produção e salubridade. Scale 1:3,000,000 or 41·6 geographical miles to an inch. Ministerio da Marinha e Ultramar. Comissão de Cartographia. Lisboa, 1885. (*Dulaud*.)

This map appears to be specially published to illustrate the productions and climatic circumstances of Angola. Statistics as to the production of every division of the Province are given in tabular form, and by a system of colouring it is intended to show those portions which are salubrious, and those which are not, but in this respect the map is likely to mislead as some notoriously unhealthy districts are not coloured at all, and this renders the map of very little value as indicating the sanitary condition of Angola. All the work of recent explorers is laid down with fair accuracy, and the limit of the free trade territory is marked.

Egypte.—Carte nouvelle de l' —, et de ses dépendances depuis le 5^{me} degré de latitude sud jusqu'à la Méditerranée, d'après les sources les plus récentes. Scale 1:3,000,000 or 41·6 geographical miles to an inch. Berlin, S. Schropp. 3 sheets. Price 8s. (*Dulaud*.)

Sklavenküste.—Karte des Deutschen Gebietes an der ——. Auf Grundlage deutscher und englischer Aufnahmen und nach Dr. H. Zöllers Berichten, construiert u. gezeichnet v. P. Langhans. Scale 1:250,000 or 3·4 geographical miles to an inch. With inset maps. Petermann's 'Geographische Mittheilungen,' Jahrgang 1885, Taf. 11. Justus Perthes, Gotha. (*Dulau.*)

Soudan.—Relievo Map of —, by Henry F. Brion. Compiled from information supplied by the Intelligence Branch of the War Office and the Royal Geographical Society, London, 1885. Horizontal scale 1:2,200,000 or 30·1 geographical miles to an inch. Vertical scale 7200 feet to an inch. E. Stanford, London. Price 1l. 11s. 6d.

Sudan Orientale.—Carte del —, per il Capitano M. Camperio, secondo le ultime esplorazioni del Cap. Casali, Messedaglia Bey, Pennazzi, Bessone, Magretti, Moscones. Scale 1:2,000,000 or 27 geographical miles to an inch. Milano. Price 2s. (*Dulau.*)

AMERICA.

Panama Kanales.—Specialkarte des —. Nach einem dem officiellen Bericht von Lieut. Rodgers beigegebenen Plan in 1:40,000 reducirt auf den Maassstab von 1:120,000 or 1·6 geographical miles to an inch. With section. Petermann's 'Geographische Mittheilungen,' Jahrgang 1885, Taf. 10. Justus Perthes, Gotha. (*Dulau.*)

Venezuela y Colombia.—Mapas para servir al estudio de la frontera entre —, por J. Viso. Madrid. 5 sheets. (*Dulau.*)

OCEANIA.

Südsee.—Karte des westlichen Theiles der — zur Veranschaulichung des unter Verwaltung der Neu-Guinea Compagnie gestellten Deutschen Schutzgebietes. Scale 1:3,000,000 or 41·6 geographical miles to an inch. Nebst Specialkarten der wichtigsten Häfen des Kaiser Wilhelms Landes und des Bismarck Archipels. Im Auftrage des Auswärtigen Amts bearbeitet und gezeichnet von L. Friederichsen, 1885. Hamburg, L. Friederichsen & Co. (*Dulau.*)

CHARTS.

United States Charts.—No. 937. West Coast of Central America, Corinto Harbour. Surveyed by the Officers of the U.S.S. 'Ranger.' Commander C. E. Clark, U.S.N., commanding, 1884. Price 6d.—Pilot Chart of the North Atlantic Ocean. No. 6. June, 1885. Published, 1885, at the Hydrographic Office, Navy Department, Washington D.C. J. R. Bartlett, Commander U.S.N., Hydrographer to the Bureau of Navigation.

ATLASES.

América.—Atlas geográfico de —, por N. Estévez. 17 sheets. Paris, Garnier. (*Dulau.*)

Mexico.—Atlas Pintoresco é Historico de los Estados Unidos Mexicanos por Antonio Garcia Cubas. Divisiones política, etnográfica y eclesiástica; vias de comunicacion, instruccion pública, orografía, hidrografia, agricultura, mineria, topografia del Valle de México y de las cercanías de la Capital; arqueología é historia. Obra adornada con los retratos de los Descubridores, Conquistadores, Misioneros y Gobernantes de México, héroes de la Independencia y personas prominentes, asi como con dibujos cromolitográficos de los principales tipos de las familias etnográficas y vistas de los lugares mas pintorescos del país, templos, palacios, edificios, monumentos públicos y objetos arqueológicos, como son armas

y divisas de los antiguos Mexicanos, instrumentos músicos, utensilios, Divinidades y ruinas célebres. Publicado por Debray, sucesores. Mexico, 1885.

This atlas contains 13 maps illustrating the history and condition of the United States of Mexico. Each map is surrounded by chromo-lithographs, and the maps themselves are beautifully executed. Independent of its great value as a statistical and historical atlas, it is quite a work of art, the illustrations being produced in a very superior manner, and having a special bearing on the subject to which the map they accompany is devoted. Many of the views are quite worthy of special commendation, and those which surround the archæological sheet will prove of great interest to all who have made a study of the ruined temples and cities of Mexico and Central America.

Royal Atlas of Modern Geography.—The —. Exhibiting, in a series of entirely original and authentic maps, the present condition of geographical discovery and research in the several Countries, Empires, and States of the World. By the late Alex. Keith Johnston, LL.D., &c., with additions and corrections to the present date by T. B. Johnston, F.R.G.S. With a special index to each map. A New Edition. W. & A. K. Johnston, Edinburgh and London, 1885. Price, imperial folio, half-bound, in russia or morocco, with gilt titles and edges, 6*l.* 6*s.*; full bound, russia or morocco, gilt, 10*l.* 10*s.*

This well-known atlas has been frequently corrected and enlarged since its first publication in 1861, new maps of Central Asia, New Zealand, South Africa, and Palestine having at different times been added. In this new edition the maps have been carefully corrected and revised, and embody the results of the most recent surveys and explorations; this is especially noticeable in the maps of Asia, Persia, Central Asia, South America, and Australia, and those of Greece and Austria have been extended to include the territories added to their dominions by recent treaties. As this atlas has now been so long before the public, and has passed through so many editions, it is unnecessary to enter into any detail as to the manner in which the maps have been executed, except to remark that they are in all respects quite equal to those that have been published in former editions, and which have gained for the Royal Atlas such a well-deserved reputation.

Saint-Martin, Vivien de.—Atlas Universel de Géographie Moderne, Ancienne et du Moyen Age, construit d'après les sources originales et les documents les plus récents, cartes, voyages, mémoires, travaux géodésiques, etc.; avec un texte analytique, par M. Vivien de Saint-Martin, Président Honoraire de la Société de Géographie de Paris, etc., et Fr. Schrader. Environ 110 cartes, gravées sur cuivre sous la direction de MM. E. Collin et Delaune. 5^e Livraison, contenant: Pays-Bas, 1:700,000.—Suède, Norvège (feuille méridionale), Danemark, 1:2,500,000.—Principaux Archipels d'Océanie. Various scales. Hachette et C^{ie}., Paris. Price 5*s.* (*Dulau*.)

This is the fifth issue of an atlas commenced in 1877, and, when completed, will contain 110 maps, of which, including the present issue, 15 have been published in eight years, thus at the present rate of publication it will take no less than fifty-eight years to complete; the tardy manner in which the work of publication progresses is the more to be regretted from the fact that such maps as have been published are beautiful specimens of cartography.

The present issue contains three maps, all of which are worthy of special notice; that of the Pays-Bas is a reduction from the surveys of the Dutch, German, and Belgian États-Majors, the two latter surveys being used in the delineation of the portions of Germany and Belgium which this sheet includes. An important and necessary feature in this map is the manner in which depressions below sea-level are indicated, not only in metres, as are the altitudes, but also in decimetres, and are further distinguished by the negative sign (—); the datum level being that of the mean tide at Amsterdam. Every place with a population exceeding 500 is given, and many others whose importance

rests rather on historical incidents than the number of their inhabitants. There are three inset maps on the enlarged scale of 1 : 62,500, of the cities of Amsterdam, Rotterdam, and La Haye. Tables of populations taken from the last census, together with explanatory notes as to signs and abbreviations, are given. All railways, canals, and means of communication are clearly laid down. Sheet 2, Sweden, Norway, and Denmark. This map is the work of M. G. Bagge, a retired Swedish officer, and the reduction has been made from the Government surveys on the scale of 1 : 100,000, from Dr. Roth's map on the scale of 1 : 400,000, and Commandant Hahr's on the scale of 1 : 1,000,000, while the portion of Finland and Denmark also are reduced from the respective surveys by the États-Majors. This sheet exhibits the southern portion of Sweden and Norway only, extending to latitude 62° 30' N.; it is a beautiful specimen of cartography. Sheet 3 gives the principal archipelagos of Oceania; they are all reductions from French and English charts, but, like all the maps in this Atlas, they are admirably drawn.

EDUCATIONAL.

Australien und Polynisien.—Schul Wandkarte von —, von V. von Haardt. Scale 1 : 16,000,000 or 219 geographical miles to an inch. Wien, Hölzel. 4 sheets. Price 10s. (*Dulau.*)

Deutschen Reiches, Wandkarte des — für den Schulgebrauch. J. I. Altermissen. Scale 1 : 750,000 or 10·3 geographical miles to an inch. 9 sheets. Lang, Metz. Price 10s. (*Dulau.*)

Europe.—Relievo Map of —. Published by Ernst Shotte & Co., Berlin, 1885. Price 1l. 15s. (*G. Philip & Son.*)

Though this map is intended to exhibit the physical features of Europe, yet it does so in such an exaggerated style that it could hardly fail to convey very false ideas, as to the magnitude of mountain ranges, to the minds of the young scholars, for whose use it is presumed this map has been prepared.

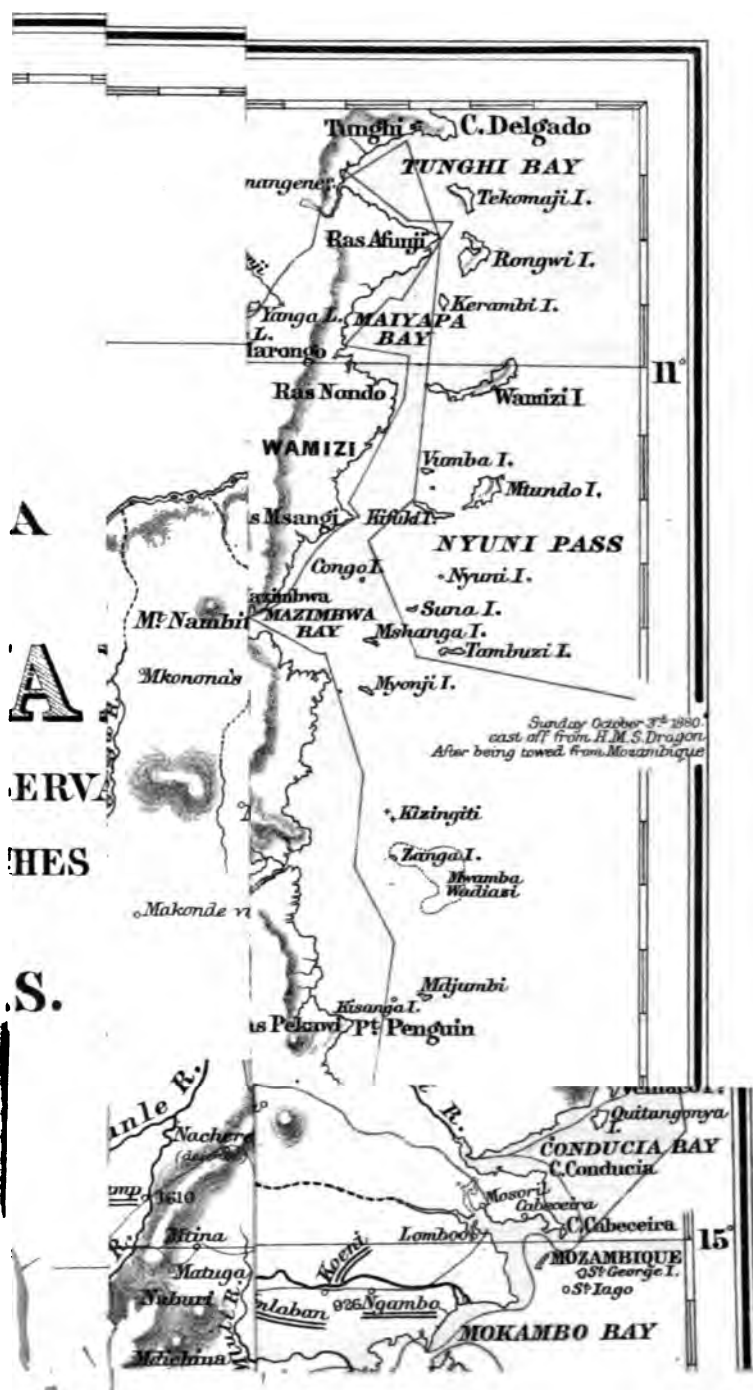
This is, however, the common fault of all relief maps, when an attempt is made to apply the system to any large portion of the earth's surface, but in the present instance the scale of exaggeration on which the mountains have been modelled is not stated, and indeed, there appears to be a great want of uniformity in the manner in which this part of the work has been done. For instance, Mount Hecla is given as being as high as Etna, the Farøe Islands, though having considerable elevations, are laid down as not having any, and Iceland is so badly modelled as scarcely to resemble that island at all. These are very serious faults, and greatly detract from the usefulness of this map.

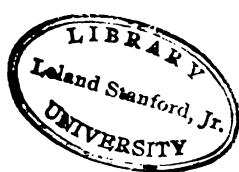
Oger, F.—Atlas de géographie générale à l'usage des lycées, collèges et institutions préparatoires aux écoles du gouvernement, et de tous les établissements d'instruction publique, par F. Oger, 12^e édition, contenant 33 cartes coloriées. Paris, Gauthiers-Villars. Price 14s. (*Dulau.*)

Perthes, Justus.—Elementar-Atlas für Schulen des Deutschen Reichs bearbeitet von Hermann Habenicht. 12 maps. Justus Perthes, Gotha, 1884. Price 1s. 3d. (*Dulau.*)

Römischen Reiches.—Wandkarte der —. Scale 1 : 3,000,000 or 41·6 geographical miles to an inch. Neue Ausgabe, von H. Kiepert. D. Reimer, Berlin. 9 sheets. Price 12s. (*Dulau.*)

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PROCEEDINGS
OF THE
ROYAL GEOGRAPHICAL SOCIETY
AND MONTHLY RECORD OF GEOGRAPHY.

The Ascent of Mount Roraima. By EVERARD IM THURN.

Map, p. 560.

I LEFT my home on the Pomerun river on the 10th of October, taking with me seventeen Indians, of various tribes, from that river, in my own two boats. One of these was a very large corial dug out of a single cedar-tree (*Icica* sp.?) which I had procured about two years before at the mouth of the Orinoco; the other, also a "dug-out," was somewhat smaller. On the 12th of the same month, having passed along the sea-coast and turned up the Essequibo, we reached the point where that river is joined by the Mazaruni. Here, partly because I was so unwell as to dread the start, partly because I had to wait for my companion, Mr. Harry Inniss Perkins, an assistant Crown Surveyor, who by the kind permission of His Excellency Sir Henry T. Irving, was to accompany me, and partly because I found it necessary to seek and purchase a third boat and to engage two more Indians, we waited until Thursday the 17th. On the morning of that day we made our real start, passing, during the first half hour, at the junction of the Mazaruni with the Essequibo, a Mr. Siedl, a professional orchid-collector, who had already visited the foot of Roraima some six months before, and who, having on that occasion met with a very fine new *Cattleya*,* was then starting, to collect more of the same plant, on a second journey to its home almost at the same moment as that of our own start, but by way of the Mazaruni, whereas we were to travel by way of the Essequibo and Potaro.

There is no need to dwell on any of the incidents of our journey up the Essequibo and up the Potaro as far as the mission of Ichowra, which we reached on the 24th of October; for the reaches of those rivers thus traversed by us have often before been described, and no special events distinguished this journey. At Ichowra we found the Bishop of British Guiana, who was then paying his first visit to that mission.

* This *Cattleya* has since been described by H. Reichenbach, jun., and named by him *C. Lawrenceana*, in honour of Sir Trevor Lawrence.

Referring to the paper, on our then proposed journey to Roraima, which I submitted to the British Association at Montreal,* it will be found that I had proposed to stay some days at Ichowra mission especially on account of the visit of the Bishop. For this, I had been led to believe, would attract to that place many of the Indians who live near Roraima; and from among these I hoped to select guides and porters to take us to their homes, following the Upper Potaro as far, perhaps, as its head.

We did indeed find a considerable number of Indians at the mission, though far fewer than I had been led to expect; but among those thus present were none from the immediate neighbourhood of Roraima, and even from any part of the savannah region in which that mountain stands only one party of Makusis. This party of Makusis, nine in all, under the leadership of one of the finest and best Indians I ever met, named Lonk, had come from a village called Konkarmo, on the Ireng river, in sight of, but very far distant from, Roraima, and by no means in a direct line between our then position at Ichowra and that mountain. As, however, it proved that of the Indians at Ichowra, these were the only available guides into the district into which we wished to penetrate, we engaged them to take us as far as their home. Consequently we had to abandon our purpose of ascending to the head of the Potaro; and instead we went up that river to a distance of but one day's travel beyond its great fall, the Kaieteur, and from that point, leaving the river, we walked back to the old mission station at Chibowie.†

But before we reached the last named place some serious difficulties presented themselves. The portages on the Potaro, at all times long, steep, and difficult, were on account of the dryness of the season more than usually formidable. Once, in hauling one of the boats, luckily empty, through a cataract it sank, and was recovered not without difficulty; another time my favourite large cedar boat, while being dragged through the forest, past the impenetrable cataracts at Amutu, was pierced by the stump of a tree, and we not wishing then to delay to mend her, was abandoned until our return. On at last reaching the great Kaieteur Fall with the remaining boats, it became evident that the transport of these, as well as of our necessarily very great but indispensable stores of baggage up the portage path, which in many places is very steep and is some five miles in length, though possible, would occupy an undue time; so that we determined to leave our boats below and to use for the further short journey which we could still make by river two extraordinarily long, narrow, and very cranky "dug

* Proceedings R.G.S., 1884, p. 667.

† This station is marked in what is practically the only available map of the colony as Enapowow.

out" boats which we were lucky enough to find moored at the head of the fall.

Chinebowie we ourselves reached on the 8th of November; but we had to wait there till the 14th while sending back the two small boats twice for the baggage. Then began our walk, and at the same time began our constant and often serious difficulties in finding a sufficient number of Indians to carry the baggage. On the first occasion, at Chinebowie, we had to leave more than thirty loads behind, purposing to send back for them at the first opportunity.

Three days of most dreary and wearisome walking through the forest in a south-westerly direction, the path very frequently leading up hills of steepness very formidable to us heavily loaded as we were, brought us to the first human habitation, a small settlement of Partamona Indians,* called Araiwaparu. Here a day's rest became necessary, and was especially welcome, in that from that tiny clearing made for the settlement in the wide forest we were able, for the first time for three days, to see the sun and the clear and open sky.

The next morning we plunged at once back into the forest. Any kind of walking more wearisome than this long progress, lasting so many days, under a dense roof of leaves hardly broken anywhere sufficiently to let in any but the smallest gleams of light, over an apparently endless and universal floor, renewed throughout the year, of fallen and mouldering leaves, can hardly be imagined. Moreover one's whole attention is ever occupied and strained; for, under foot, the apparently smooth carpet of dead leaves is really most treacherously spread, not on the earth, but over, and hiding, a dense and intricate network of tree-roots of all shapes and sizes, any one of which may at any moment throw the unwary traveller heavily and dangerously to the ground; while overhead, hang down numberless coiled and looped and tangled bush-ropes and pendant branches of trees, each ready to catch round the neck of the walker or at least to sweep off his hat and cause him to stop, to his great discomfort and the disturbance of his many burdens. Long walking through such changeless gloomy places induces, if I may judge from my own experience, a curious and painful feeling. The senses of sight, sound, and touch are dulled to annihilation, except, and it is a great exception, so far as each of these senses is intensely and painfully on the watch for trap-like root or branch, threatening head or foot, for sound of water to break the stillness, for light to dispel the gloom; and corresponding with this cessation of the activities of the senses of the body comes a dreamlike activity of the mind, which either races back through a long series of just such of the past scenes in one's life as are of most painful or most unwelcome memory, or flies forward along the anticipated course

* The Partamonas are a branch of the Akawois. I propose to give some further account of them in a special paper which I propose to devote to the ethnological facts noted during our journey.

of one's life, which then seems one long vista of pains and sorrows and dangers. Thus on the fourth morning of our journey through the forest life seemed to me as gloomy as it could possibly be; the difficulties which lay before us seemed insurmountable; success seemed impossible.

So it was for the first few hours of our walk that morning. Then suddenly, at about 10 A.M., the forest ended in a distinct line and the path passed out of its shades on to the wide open savannah—and such a glorious savannah! It ran along the ridges of the mountain, down its slopes, over wide, well watered and green plains, up on to other ranges of curiously terraced mountains, and on, ever over mountain after mountain until it lost itself, to our eyes, in the blue misty distance. A most refreshingly cool, almost cold, and strong wind, loaded with sweet wide-gathered scents, hurried a few light clouds across the bright blue sky, lighted by a glorious sun; and the shadows of these clouds racing over the mountains and the valleys and over the many well-wooded ravines completed the intense and glorious beauty of the scene. From out of the long black prison of the gloomy forest, a step had brought us into this splendidly wide world with its atmosphere of freedom and welcome promise of success.

Soon, in the distance, perched on a flat and high grassy hill-top, a valley lying between us and it, we saw the high conical thatched roofs of a large Partamona village, which, like all the villages of that district, is situated so as to possess an outlook of quite ideal magnificence. Coming to this village, called Euworra-eng, an hour later, we found it full of people, many of whom were at the moment occupied in a large building, which they called a church, in singing, shouting, and talking, in curious attempt to imitate the service which some of them must have seen in the mission church on the Potaro.

Yet another day's walking brought us to Konkarmo, the village of our guides. From it the promised distant view of Roraima was indicated to us; but the mountain, if really visible, was so distant as to be discernible rather by the eye of faith than of the body.

Since we had left the forest—and this is equally true of our onward journey from Konkarmo to Roraima—the path, leading for the most part along the crests of long ranges of savannah mountains, was, in its circumstance of scenery, of probably unsurpassable magnificence; but it led often up or down most precipitous mountain sides and always over ground very rough and very stony. Our Indians, who, coming into those rough places from the plain of the Pomerun, where the almost universal mud is soft to the feet of the walker, and where, moreover, the denseness of the forest and the wide-spread network of river and stream cause almost all travel to be done by boat, were totally unused to carrying heavy burdens for long distances, and still less used to walking over stony ground, were so knocked up by the time we reached Konkarmo that it was evidently out of the question to send them back

for the baggage left at Chinebowie. However, we found no difficulty in getting a sufficient number of Indians to go back from Konkarmo; and these, in the wonderfully short space of a week, returned with all that we required.

I may here take the opportunity of stating that at each inhabited place to which we came we left a certain amount of provisions, to be used on our homeward journey; a circumstance which afterwards proved of the greatest advantage to us.

While our messengers were fetching the baggage to Konkarmo, we found plenty to occupy us. There, as we had found throughout the course of our journey to that point, the country had been so long without rain that hardly a flower was to be seen; and but very little botanical collecting was possible. But at Konkarmo there were other circumstances of interest. There, for the first and only time in Guiana, I saw stone implements made, and indeed actually learned to make them myself, after the rather peculiar manner there followed. There, too, the people, who were very numerous and most hospitable and kind, tried to interest us, and effectually succeeded in so doing, in many ways, especially perhaps by dancing and playing games for us after their own manner. Not the least curious or the pleasantest matter to be studied at Konkarmo was the extraordinary ecclesiastical mania which then possessed the people of that place and of that whole neighbourhood, inducing them to give up almost all work and to devote themselves instead, throughout the day, to an extravagant and perfectly unintelligent imitation of such church services as some few of the party had seen, when on their travels, at the distant mission. But these are all subjects which must be told of on some other occasion.

From Konkarmo, too, we sent for certain Arekuna Indians, living in the direction of Roraima, who were said to know the path to that mountain; and they, on their arrival, indeed, themselves pretended to know the way and agreed to take us. In the event, as far as their carrying powers were concerned, and in their willingness and good temper—the latter no unimportant considerations under such circumstances as ours—this party of Arekunas proved themselves right good men and true; but they caused us no little trouble in that none of them knew the path beyond the Cotinga river more than very imperfectly, and knew it not at all beyond the Arapu river, and in that their leader, "Arekuna John" as we called him, under a mask of good temper, concealed the most cunning, and almost the most grasping disposition that I ever met with even among his tribe.

It may be as well here very briefly to distinguish the various Indian tribes with which we came in contact. The Potaro river is almost exclusively occupied by Akawois Indians of the Partamona branch; and these same Partamonas have spread through the forest which reaches from that river toward the Ireng, and have even emerged from this

forest and occupied, as at the village which I have mentioned, of Euworra-eng, the edge of the savannah which extends from the limits of the forest to the Ireng. It was, therefore, through their country that we first passed. Next, when we were well on to this savannah, we came to the land of the Makusis, just at its most northern point. Upward from that, we passed at once into the land of the Arekunas, which stretches from there to and beyond Roraima. All the three tribes, the Partamonas, Makusis, and Arekunas, through whose districts we thus passed, are of Carib race and speak but slightly divergent languages. The three tribes differ from each other, however, considerably in appearance and still more in character. The Partamonas are large, strongly built people, ugly in body and in features, and dirty in habits. The Makusis, smaller, more slightly built men, with limbs of curiously beautiful form and wonderful agility, with unusually good features, cleanly in habit, most hospitable, obliging, and generous, are by far the pleasantest of all the Indians of Guiana. Lastly the Arekunas, people of large strong bodies and generally of ugly features, are physically the most powerful of all, and are of great good temper, but as companions of the traveller are objectionable on account of their extreme greediness of disposition; among all the many of their number whom I employed I never succeeded in satisfying one by the payment I gave, whereas I do not remember ever leaving a Makusi unsatisfied.

Early on the morning of the 28th of November we said good-bye with regret to Lonk and our other Makusi friends at Konkarmo, and started with our new Arekuna companions toward Roraima. The footpath led us, winding much, but always over the open savannah, to the Ireng river, which we crossed; at the customary Indian ferry, in three very long, narrow, and cranky dug-out boats which we found there. After another stretch of savannah, distinguished from a botanical point of view by the first appearance of a dwarf and very graceful bamboo which afterwards became a very common and characteristic plant along our path, we wound for a long distance through a light wood, the underbush of which consisted entirely of a beautiful scarlet-flowered shrubby *Justicia*, then in full and picture-like bloom. Next came another stretch of savannah; then, most wearisome of all, an Indian cassava field; and at last we reached our destination for the night, the first Arekuna settlement, called Nunie, on the Wotsa creek.

Here there were two complete houses and one unthatched and un-walled frame. For almost the only time within my experience the hospitality of the Indians was insufficient to induce them to give up even a part of either of their own houses, and we slung our hammocks to the unfinished framework. Immediately behind the houses was a hill of considerable height, up which we were taken just before sunset to see our first real view of Roraima, still far away to the west, or rather north-west. It was certainly a beautiful picture that lay before us. In

the furthest distance, reddened by the setting sun, rose the famous mountain of our quest; between it and us a vast mountain-covered plain, its hollows filled by the dark shades of evening. its highest points touched into wonderful clearness and colour by the last light of the sun. Soon all was dark; and then again, even while we strolled down to our hammocks at the foot of the hill, the mountain-encircled valley in which we were was new lighted by the strong white light of the moon; and in many places far up on the mountains round us, rose and fell, with most weird effect, the flames of great fires which in that season of dryness were burning the scanty vegetation of the mountain sides and sending up to heaven many a pillar of fire by night and cloud of smoke by day.

We got off from Nunie the next morning not without considerable difficulty in apportioning the extra loads among some additional carriers whom we were fortunate enough to find there. The pleasure of the start in the early mornings was nearly always spoiled by such difficulties as this, I having to wait behind adjusting loads, imploring people to take up extra loads, and then, after perhaps half-an-hour's delay or even three-quarters, having to hurry forward to get to the head of the long procession of carriers, often forty or fifty in number, who, in twos and threes at a time, had been able to start so long before.

The first half of our walk from Wotsa was through country very similar to that passed the previous day. So far, though we had climbed numerous steep hills only to descend almost immediately into almost correspondingly deep valleys, we had on the whole made a comparatively small ascent. But this morning, just after passing the last inhabited house which we were to see for three days, we climbed a tremendous hill and walked for the whole afternoon along a very curious long and narrow tableland of which our recent ascent was one boundary. The view was bounded on either side and close at hand by slight swellings of the ground some twenty or thirty feet in height; or if anywhere a more distant view could for a moment be obtained it was only of rolling, grass-covered, white hills. The soil on this tableland consisted for the most part of pure white sand, or rather of sandstone rock of so soft a nature that almost the lightest touch powdered it to sand; the vegetation was chiefly a low, hoary grey grass; and the general effect was of a desert white with hoar-frost. Water was very scarce; there was not a tree in sight with the exception of two small coppices seen in the far distance. Late in the afternoon we had still come to no trees to which we could hang our hammocks. Then we reached a tract where, as is not infrequent, the sand soil was overlaid by a thick layer of hard yellow clay, so sun-dried and so cracked as to resemble a very irregular tessellated pavement. Ground of this kind is called by the Indians "eppeling." On this special eppeling, in one place rather higher than the surrounding ground were scattered a considerable number of

low straggling rhododendron-like shrubs (probably a *Clusia* or nearly allied to the genus) with most exquisite flowers deceptively like those of an English dog-rose. Here, in default of a better place, we determined to spend the night. Three or four old hammock-poles lying on the ground showed that we should not be the first occupants of the spot. These poles served for my companion's hammock and mine. The men cut branches of the rose-flowered shrub, and with these made themselves romantic, but scarcely comfortable, beds on the ground.

The next morning, after following the tableland for yet a little further, we began to descend along an extraordinarily broad and almost perfectly smooth jasper rock, the sloping bed of a stream which was then almost dry. Wherever a little peatlike soil had accumulated on this rock grew sphagnum-like mosses, embedded in which, among other characteristic plants hitherto only met with on the Kaieteur savannah, were numerous, but singly-standing, plants of the curiously formed and coloured *Brocchinia reducta*, its two or three pale yellow leaves, overlaid with a greyish bloom, looking like a loose roll of two or three sheets of paper stuck on end into the ground.

After this, ascent and descent, both generally very steep, followed each other in rapid succession; and many streams, mostly jasper-bedded, were crossed, their white water contrasting beautifully with the smooth-topped step-like layers of polished red, or more rarely pale green, jasper over which they flowed or fell. One stream, the Wayanok, its bed not of jasper, but of ugly mud, had its banks well wooded, the trees meeting over its gloomy Styx-like waters; otherwise hardly a tree was to be seen, except where in the valleys long lines of æta palms (*Mauritia flexuosa*) marked the moist bed of a stream.

At last, at midday, we came to the Cotinga river just below Orinduie cataracts, at a point where two coppices, one on either bank, faced each other, between which the stream ran, so broad and deep, that to cross without a boat seemed hopeless. Yet to stay where we were seemed almost equally impossible on account of the enormous numbers of sandflies which there, for the only time during our journey, filled the air and made life a burden. But some of our men saying they knew of a boat which they would fetch, we endured the sandflies as well as we were able for the rest of the afternoon; and in the evening the boat was brought.

The crossing of the river with all our baggage occupied an hour and a half the next morning before we could start once more on our savannah walk. Towards midday we ascended a very high grass hill and, resting just before reaching the summit, we saw a very beautiful scene. One of our party while in the valley below had carelessly thrown down in the dry grass the match with which he had lighted his pipe; and now down in the valley below us already a great field of fire was moving almost as rapidly as the shadow of a flying cloud across the vast plain.

Again, ten minutes later, having reached and passed the top of the

same hill, we suddenly faced another most glorious view of different character. Nearest and right opposite, across a narrow valley, rose the grand rocky mass of Waetipu, its highest point, a somewhat conical mass surmounting sloping sides covered in places with turf, in places with forest. On the right, the central mass of Waetipu passed down into a long wooded ridge, which on the extreme right rose once more to form the two most remarkable and pointed peaks of Macrobang; on the left of Waetipu, seen for once clear in the distance, appeared the tremendously magnificent south-eastern corner of cliff-walled Roraima, which was still a day's journey from us, and behind that again the equally rugged and magnificent end of Kukenam.

One more magnificent distant view of Roraima we had the next morning, just after rounding the south-eastern end of Waetipu; then we lost sight of it till the afternoon, when from a high ridge it appeared again close to us, while between us and it, far below us, lay the village of Turoiking,* at the junction of the Ipelima creek with the Arapu river.

When we reached the village it was empty, and, though there were signs of recent occupation, we were persuaded by the assertions of our Arekuna guides, who had now reached the end of the world as known to them in that direction, that it really was a deserted village. Most of the houses were more or less dilapidated, and the large "church," of the kind already mentioned, was almost in ruins. Matters did not look very bright for us just then. No one of our party knew the way across the low range which still lay between us and the towering cliffs of Roraima, that is from the valley of the Arapu river, in which we then were, into the valley of the Kukenam river, from which latter valley our first attack on Roraima was to be made; nor did any of the Arekuna carriers who had come with us so far wish to proceed further with us into lands quite unknown to them. Nor again, owing to the absence in our present position of the inhabitants of Turoiking, did it seem possible to procure either new guides and carriers or the supplies of fresh provisions which were very necessary for our large party.

It was, therefore, a pleasant sight when, late in the afternoon, a few of the inhabitants of the village straggled back into it. Among these was an old, but most extraordinarily strongly built Arekuna, named Simon, whose every word, corresponding to the size of his body, was an hilarious roar. He promised, if we would wait till the next day, to send his son the next morning to a village somewhat nearer Roraima to fetch guides, and perhaps carriers, who would take us to that mountain; and even that night he managed to procure for us a small supply of provisions. Unfortunately at noon next day his son returned with the

* Marked in the ordinary maps of the country as Ipelemuta, i. e. the place (*uta*) on the Ipelima creek. It is no uncommon thing to find a village with two names after this fashion.

unwelcome news that another white man had just arrived at the foot of Roraima, from the north, had taken away every available Indian as guide or carrier, and had bought up all the food, which was said to be very scarce in the valley of Kukenam. The white stranger could of course be no other than Mr. Siedl, who having started on his journey via the Mazaruni on the same day as we started by the Essequibo, had reached the point at which we were both aiming, one day in advance of us.

Our prospects were certainly gloomy; and we nearly determined to send back without delay, not only the Arekunas, but also all but three or four of the Pomerun men, and with these to push on to Roraima as best we might, finding our way by compass and leaving almost all our baggage behind us. Luckily, however, just before sunset two men were seen coming down the mountain from the direction of Roraima; and these, on their arrival, proved to have been most kindly sent by Mr. Siedl, who had heard of our arrival, to guide us farther. After this new arrival a second night was spent at Turoiking far more pleasantly.

Next morning, the Arekunas, who had come with us so far, suddenly announcing their wish to come farther, we advanced with all our party and baggage, and, after fording the Arapu and passing the ridge which here separates the water-system of that river from that of the Kukenam, we came soon after midday to the village of Teruta, which stands on a small eminence only separated from the southern slope of Roraima by the narrow bed of the Kukenam. Our arrival at this point was on the fourth of December.

The village where we now were was very full of people; and from the hill on which it stood various other houses were to be seen. There seemed therefore good prospect of obtaining sufficient Indians to help in our work. Food too, in the shape of cassava, yams, and pumpkins, was evidently abundant, despite the assertions that had been made to the contrary; and the only thing to disturb the comfort of our prospects was the unanimous and apparently truthful statement of every one that game and fish were so scarce as to be almost non-existent in the district.

Siedl, who had arrived at Teruta the day before, had gone up that morning to a house which he had built for himself far up Roraima, at the nearest available point to the base of the cliff-like part. We took up our quarters for a day or two in Teruta itself, in order to determine our further plans.

The view of the two mountains Roraima and Kukenam from the village of Teruta is of indescribable magnificence; yet, though words must fail to give any adequate idea, some attempt must be made to describe the main features of the picture.

The two mountains, the greatest length of both of which is from north to south, lie directly east and west of each other, only separated by a gorge, which is at one point very narrow and is apparently

throughout the greatest part of its length of no great width. Roraima, the easternmost of the two mountains, roughly speaking forms at its southernmost point a right, or perhaps a slightly obtuse, angle. Westward from the apex of this angle the side of the mountain runs upward in a generally straight but really slightly concave line for about four miles, almost directly north-west, and then, forming at that point a somewhat similar angle, which angle is the most western point of the mountain, its side then turns to the north-east. On the other hand, Kukenam, the westernmost of the two mountains, ends at the south in a somewhat rounded point, from which its eastern side runs upward for somewhat less than four miles in a north-easterly direction, till it almost meets the extreme western point of Roraima, and after there forming its eastern angle, thus exactly opposite the western angle of Roraima, turns again to the north, or perhaps slightly north-west. Thus the south-west face of Roraima forms with the south-eastern face of Kukenam a very obtuse angle, at the apex of which the two very closely approach each other, being only separated by the gorge at its narrowest point. Supposing, next, that a straight line were drawn to join the southernmost points of the two mountains, this would form a base-line making, with the above-mentioned angle, a triangle; and on this base-line, about midway between the southern points of the two mountains, stands the village of Teruta, which thus immediately faces the gorge between the two mountains and commands a full view of the south-western side of Roraima and of the south-eastern side of Kukenam.

So far I have been attempting to describe the real relative positions, as determined by actual observations, of the surroundings in which we now found ourselves. From this reality the appearance of these surroundings, as is not unfrequently the case, differed somewhat. From Teruta the two mountains seem to rise from a common sloping base; and, placed on this, each seems to consist in itself of a sloping portion surmounted by the cliff walls. Looking directly north, we saw straight into the narrow forest-filled gorge, on either side of which, like Titanic gate-posts, rose slope surmounted by cliff, on the right that of Roraima, on the left that of Kukenam. Thick woods entirely clothe the slope of the latter, fill the gorge between the two mountains, and have climbed up from out of the gorge just on the extreme western shoulder of Roraima. The greater part of the slope of this latter mountain, much broken into curious terraces and often fluted, if I may use the expression, in a very remarkable manner at right angles to these terraces, is for the most part grass-covered, though in places occupied by coppices; while on the extreme right, i.e. on the southern shoulder of the mountain, thick woods again occupy the entire slope. But even on Roraima the entire upper part of the savannah slope is as thickly wooded as is the whole of that of Kukenam. And, alike in both mountains, above the slope,

springing directly from out of the highest woods, rise the huge perpendicular cliff-walls, tremendous, and bare but for great patches of vegetation, really dwarf enough, but appearing at that distance merely as moss and lichen. Alike, again, in both mountains the sky-line, straight enough, is yet curiously jagged as is a very rough-torn edge of paper. And alike from both mountains fall streams of water, more or less visible according to the season, the most constantly conspicuous being, from Kukenam, the river of the same name, from Roraima the Kamaiwa and a river, of unknown name, with which we afterwards had close experience.

One very characteristic feature of the scene has not yet been mentioned. It has been stated that, on the extreme right as seen from Teruta, the whole southern shoulder of Roraima is wooded. From the cliff of that mountain where, at its southernmost point, it rises from these woods, a portion has at some time been vertically detached, and this still stands, a rude obelisk of naked rock rising from out of the forest to tower above the closely neighbouring cliff of Roraima.

Lastly, this mountain panorama, the key-note of the scene, as one looks at it from Teruta down in the valley below, being of gigantic vastness and overpowering size, is almost always rendered more gigantic, much more mystic, by the clouds and vapours which almost always float around it, often gathering into one mass so vast as to obscure the whole, still oftener piling up smaller, but still dense, masses here and there on the mountain or in the gorge. Rarely did we see the scene quite clear; a fact which, as the Indians were never tired of explaining to us, was owing to the habit of the mountain—they regard both mountains as one—of veiling itself whenever approached by white men.

This latter point reminds me to note the extreme veneration, and even affectionate regard, with which the Indians of that district, even those who live far from, but yet in sight of, Roraima, regard that mountain, vividly personifying it, it always seemed to me, in a more real fashion than even their wont.

By a lucky chance, on the day of our arrival the mountain was fairly free from cloud; so that we saw a ledge, running diagonally from the bottom to the top of the opposite cliff of Roraima, which, from where we were, certainly seemed to offer a very practicable way of ascent. Yet, knowing that of the few other than Indians who had visited Roraima and had pronounced its summit inaccessible almost all had tried to attack it from the very point at which we now were, we failed to persuade ourselves that our ledge was really practicable. And only at one other point on this face of Roraima did it seem in the least possible even to think of attempting an ascent; and this second point afforded but the very smallest gleam of hope.

The day after our arrival at Teruta, Perkins and I, with two of the Pomerun Indians, went up the savannah slope of Roraima as far as

the spot where Siedl had built his house. We found him some four miles up the slope, almost at the top of the savannah, at a point which afterwards proved to be 5405 feet above the sea-level and 1654 feet above the village of Teruta. He had made a tiny clearing within the edge of the forest where it met the savannah and had there established himself. He had visited this same point on Roraima in the previous April, and had then found, and collected, considerable quantities of his *Cattleya*; but the plants had perished on the way home, and he had now returned for a fresh supply. He had noticed our ledge, but was convinced of its impracticability; and he had moreover heard a tradition, which I afterwards heard but always discredited, that some Indians had once attempted to ascend by it to the summit, but had been stopped almost before they made any progress up it by a great ravine which, invisible from below, really separated it from the summit. No other point seen by him seemed, he said, to afford any hope of access.

The question which now had to be decided was whether to delay for a time on this south-western face of Roraima, which had been, comparatively speaking, so often visited and always pronounced inaccessible, in the hope that, with our greater advantages in the way of the longer time at our disposal and the sufficient, though by no means too abundant, supply of provisions, we might succeed in finding a way where others had failed; or whether it would be better at once to follow out our programme of walking round the mountain till perchance we might find an accessible way up one or other of its less known sides. While debating this, a glance at the ledge decided us to try it at all risks; and we returned down the mountain to our old quarters at Teruta, there to make preparation for reascending and building a house close to Siedl's.

The next day, Saturday, was spent in telling off twelve of our Pomerun Indians, who were to leave us and start for home the next morning, in order to reduce the demand upon the provision store; in writing letters to be carried home by these messengers; and in sorting the baggage so as to take up with us only the most necessary things, and even of these only such as our four remaining Pomerun Indians with a few Arekunas could carry up. Early on the morning of Sunday, our twelve companions who had come with us from home filed off in one direction across the savannah, while we who remained marched in the other direction up the slopes of Roraima.

The house which we built, and, as it turned out, inhabited for nearly a month, was close to Siedl's. Externally it was an ordinary Indian house, thatched, however, on roof and walls with the leaves of a large and handsome palm, a *Geonoma* of a species new to me but very abundant higher up the mountain. Inside, in the centre of the house, between our two hammocks, was a gridiron-like staging or babracot of hard green wood, under which a large fire was kept burning day and night; this arrangement being partly suggested by the extreme coldness of the

temperature, which at night sank as low as 48° Fahr., but was chiefly intended to afford means of drying the botanical paper, which, because of the great dampness of the air and the feebleness of such few rays of sun as forced their way through the almost constant mists, it was quite impossible to dry by ordinary means. Even though the paper not in use was thus kept constantly over the fire, and although almost every minute of my day during which I was not working in one way or another away from the house was devoted to turning and changing these papers, it was a matter of most extraordinary difficulty to dry the plants.

Our own house was finished even on the day on which we ascended; and the next day our Pomerun Indians built a similar but larger house for themselves. Later on we built another house for the living plants collected; and two parties of Arekunas who came up and attached themselves to us each built a similar house. Moreover, Siedl, beside his own house and that for his men, had two very large buildings which he gradually filled with the *Cattleys*. In fact, before we left the place it had become quite a large and picturesque settlement.

But I must return to the account of the beginning of our stay on Roraima. The savannah immediately in front of our houses was that same wonderful swamp which Richard Schomburgk had visited forty years before, and had so enthusiastically described as a "botanical El Dorado."* Nor was the inscription inapt. It extends over a considerable space of undulating ground, occupying in fact the whole of the upper part of the savannah slope, and, except where, in many places, rocks crop up, either singly or piled in masses, appears to the eye to be chiefly occupied by long waving grasses over which are borne innumerable rich large violet-coloured flowers of the lovely *Utricularia Humboldtii* and, on equally tall but branched flower-stems, the quaint yellow-brown flowers of an orchid (*Cypripedium Lindleyanum*). But, on looking more closely it will be found that almost equally abundant with the grasses are many small and various yucca-like plants, many heath-like *Befarias*, many more dwarf but lovely orchids, especially the beautiful and sweet scented *Zygopetalon Burksii* and a rosy flowered *Cleistes* (*C. rosea*), many ferns, and innumerable other plants. In not very frequent places, where the grass is not so long, are considerable patches of the "pitcher-plant" of South America (*Heliamphora nutans*), with its grotesquely pitcher-shaped leaves and delicate white flowers, borne on ruddy stems. On the rock patches, on the other hand, grow pretty flowered shrubs of many species, and among these many orchids, especially a long sprayed black and yellow flowered *Odontoglossum* (*O. nigrescens*?) and an *Epidendron* (near *E. imatophyllum*) with flowers curiously various in colour, mauve or rose to white and from yellow to fawn, many ferns from the low creeping kinds to the tall bracken (*Pteris aquilina*) and, yet taller, various species of tree ferns; and, though this is not abundant in that

* 'Reisen in Britisch Guiana.'

position, there also grows, most striking and suggestive of all to the Englishman who has been long in the tropics, a real blackberry (*Rubus Schomburgkii*) very similar to the hedge brambles at home. And again, very sparingly on the higher open parts of this savannah swamp, but more abundantly and luxuriantly inside the small coppices which break its extent, stands the remarkable aloe-like *Brocchinia* (*B. cordylinoides* Baker), which, occurring there in very far greater abundance and luxuriance, forms the chief physiognomic vegetation of the Kaieteur savannah. And again on the edges of the coppices of the savannah slope and on the edges of the forest in the midst of which this lies, are many other striking plants, a peculiar climbing bamboo, tree ferns of several species, especially a great cycas-like fern, thick stemmed with erect dark green fronds (*Lomaria Schomburgkii*), and among these, wonderfully luxuriant examples, with flowering stems of seven and eight feet high, of the various coloured *Epidendron* which has already been mentioned as growing, with far dwarfer habit, on the dry rocks of the savannah. It is no wonder that Schomburgk was enthusiastic about such a place as this.*

Many days we spent in exploring and visiting every accessible portion of this savannah slope and of the forest belt above, even as far as the base of the cliff, partly in order to examine the vegetation, but chiefly in order, when a few rare hours of clear weather admitted of this, from every available point to study the ledge up which we hoped to ascend. Sometimes it looked possible, sometimes impossible. To make clear the nature of the position some further account of the contour of this aspect of the mountain must be given.

The gradual savannah slope has already been distinguished from the much more abrupt forest slope. But in this latter again three regions or belts may be quite clearly distinguished. First, and immediately above the upper edge of the savannah slope, is a belt of very dense wood in which the trees are small, but stand very closely together, great quantities of the *Geonoma* already described and a few curiously dwarfed manicole palms (*Euterpe edulis*) occurring in it, the whole being much matted together by the long winding stems of the small bamboo. The path upward through this is steep and slippery, but there are few boulders. Next comes a belt of bush in which the vegetation is chiefly low and bush-like, averaging not more than from six to eight feet in height, and indeed consisting in great part of *Brocchinia cordylinoides*. The ground here is almost completely covered by boulders, though these are not often of any very great size. Next comes a belt of rock and tree, where the boulders, many and large, often tower overhead, and the trees few, stunted, gnarled and twisted, grow round, over and under the rocks, and their branches meeting overhead there intertwine to make a dense rock. In making a path through this belt one passes now over the

* The botanical observations made during the expedition will be dealt with in a separate paper.

branches now under the roots. But perhaps the most striking character of this belt, though it is evident in somewhat less marked degree on the other tree-covered parts of the mountain, is the universal coating of long and dense, green mosses which wraps rock, branch and trunk, and indeed every visible thing underhead and overhead, suggesting a feeling of muffled stillness much as does a coating of snow at home. And yet another feature, present in all the belts, but in much the most marked degree up here, is the sponge-like saturation of earth, moss, rock and trunk with moisture; and, consequent on this moisture, the vast abundance of luxuriant ferns, especially filmy ferns, is everywhere noticeable.

Lastly, immediately above this belt, between it and the foot of the cliff is a narrow zone chiefly occupied by vast quantities of the blackberry already mentioned, growing here among the loose débris which seems almost constantly to fall from the summit of the mountain. This latter belt reminds one strangely of home, not only because of its bramble-growth, but because interspersed in the latter are vast quantities of the South American form of our English bracken (*Pteris aquilina*), with a fern externally resembling the English male-fern, and large quantities of heath-like *Befaria*. Only the abundant clumps of *Geonoma*, a few tree ferns and many small but beautiful tropical plants of the same family, and the occasional flight of a humming-bird, remind one that one is in the tropics.

Having passed the bramble tract, to ascend just at the feet of the cliff and to look up offered a wonderful experience. The wall runs for the greater part of its two thousand feet height straight up, but at the actual top it overhangs. Water, falling continuously, even in the dry season in which we were there, from every part of the upper edge, reaches the ground not at the base of the cliff, but some four or five feet, or even sometimes further, from that base.

After due examination, it appeared that there would be especially three points of possible difficulty to be met in making an ascent by the ledge. In the first place, that part of the forest slope which we should have to pass before reaching the foot of the ledge had, as we then thought, never been penetrated by man and was of quite unusual density, chiefly on account of the great quantities of rampant bamboo which matted together the trees of which it was composed; and, while, at first, we had only our four Pomerun Indians, it really seemed almost out of the question to cut our way through this. Fortunately for us, many Arekunas came up the mountain to us, before many days, and, building a house for themselves, placed their services at our disposal; whereby we were enabled to have the path cut up as far as the foot of the ledge while we spent the time in other work. But a second difficulty, evident from below, was presented in the fact that the lower part of the ledge seemed much broken, and indeed appeared to be not so

much a continuous shelf but rather a shelf which had at some time been broken up into large masses of rock, which, towering over the forest, looked formidable enough from below. Siedl, till the time when we practically proved the possibility, maintained that it would be impossible to climb over this broken part of the ledge and even eventually on this account declined to accompany us on our ascent. But the most doubtful point of all was where, some two-thirds up the length of the ledge, a considerable stream of water fell on to it from the summit of Roraima. This stream, falling on the ledge, had eaten away, and made a deep gap, impenetrable to the eye from below, in its surface. It certainly appeared that this might well be impassable; and our only hope was that we might just possibly be able to climb down into it, and up its further side and so on to the upper part of the ledge, which from that point to the summit of the mountain seemed accessible enough.

The path to the foot of the ledge once cleared, and all such observations as could be made from below having been completed, we still had to wait for a tolerably clear day on which we might make our first attempt to ascend with some prospect of success. This we did not get for some time, to the great trial of our patience, we almost fearing to spend so much of our time on that side Roraima unless we could be more certain of success there than we then felt.

At last, on Sunday, the 14th of December, though the morning did not seem to promise an altogether fine day, yet, unwilling to lose another day, and fearing yet more to leave the Arekunas longer unoccupied lest they should have time to discover the discomforts of the place, we made a start for the top by way of the new path, at 9 A.M.

We found that the path had been cleared only just sufficiently to allow us to pass, and that not without considerable difficulty. The ground was exceedingly slippery, in consequence of the heavy rains which had recently fallen; and this special difficulty was enhanced by the fact that much of the ground was occupied by a large flag-leaved *Stegilepis* which, trodden or cut down as we advanced, gave us many a fall, on account of the great slipperiness of the whole plant and by the big *Brocchinia* (*B. cordylinoides*), the latter so densely placed that we had to walk over their tops, plunging and slipping about in the considerable quantity of water which each of these plants holds in its axil. Seldom, if ever, did we step on the real ground, but instead we climbed, hands and feet all fully employed, over masses of vegetation dense enough to bear our weight, over high-piled rocks and tree-stumps and not seldom under boulders of vast size, up tree-trunks and along tree-branches, across the beds of many streams so filled with broken rocks that the water heard trickling below was unseen. Nor did the dense and universal coating of moss, filmy ferns, and lungworts, afford any but the most treacherous foot-hold and hand-hold.

At last, about 11 A.M. we reached a station near the foot of the ledge,
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at the base of the cliff, where some old outlass marks on the trees attracting my attention, it appeared after inquiry from the Indians that Mr. Whitely had been some years before. How he reached it I do not know; certainly our path did not seem in any way to have touched his until just before the base of the cliff. I presume, but am not sure, that the station at which we now were was the highest to which Mr. Whitely attained, for there were no traces of any further advance having been made, up the ledge.

Our Arekunas had cleared the path a little further than the point where we now were; but on following this up we found it did not go far. From the point where their work had ceased, I sent them on to clear further, while I laid between papers such plants as I had already collected; but they soon returned declaring they were frightened and could go no farther. Then the Pomerun Indians came splendidly to the front, especially one named Gabriel, who declaring, on the strength of having once been between the mouth of the Pomerun and Georgetown in a small provision sloop, that he had been a sailor, went first with me up one of the stiffest pieces of climbing that one need wish to remember, till we reached the top of a shoulder, a considerable way up the face of the cliff; and from this point advance did not seem possible. The boiling-point thermometer here showed a height of 7321 feet.

For more than an hour past, thick mist had enveloped us; and not only did this now become thicker, but heavy rain also began to fall. The thermometer, though it was midday, fell to 54° Fahr., so that the cold, to us accustomed to the tropics, was intense. Moreover all the bushes and moss-covered trees which we had to grasp, and by their means to raise ourselves, had been like sponges filled with iced water, so that we could hardly hold on to them for the numbness of our hands. Under these circumstances we determined to turn homeward for that day, satisfied with having proved the practicability of making our way for a considerable distance up the ledge and even, as it afterwards appeared on examining the place from below, to a point above that at which the broken nature of the shelf had seemed to offer so serious a difficulty, so that only one doubtful point still remained to be passed, that at which the stream fell from Roraima on to the ledge. Our next attempt would, we hoped, be made on a finer and drier, and more especially on a clearer day. And whenever that attempt might be made we determined not to keep so near the inner edge of the ledge, under the base of the cliff, for we had found that this led us to an impassable point, but to keep as close as might be to the outer edge.

The journey downward was quick, but far from pleasant. As in coming up we had got over much of the ground by crawling on all fours, so in going down we passed much of the way, but involuntarily, by sliding in a sitting posture.

For the next three days, heavy rain and thunder were almost in-

cessant. Then on Thursday, the 18th, came a bright morning, but with a few small clouds floating about down in the valley below us; but in consequence of the late rains the bush was still very wet and the stream falling from Roraima on to our ledge was very full of water. However, fearing that the rainy season had really set in, we determined to try to get at least as far as the foot of the fall—the one remaining doubtfully practicable part of the ledge—in order at least to know whether this last point was passable or not.

When we reached Whitely's station at the base of the cliff the weather was still clear. From there we followed the previous Sunday's path for a short distance, but soon, instead of going up to the top of the first spur on the ledge, to our Sunday's station, we began to cut a new path round the spur.

It should perhaps before have been explained that what had appeared from below the broken part of the ledge really consists of three rounded spurs, or shoulders, running from a little way up the cliff down on to the ledge; and that these spurs are all wooded, though not so densely as the ground below the ledge, while in part a few huge boulders stand out over the tree tops. These three spurs occupy about two-thirds of the ledge as seen from below; then comes the part of the ledge on to which the fall dashes from the cliff above. After that the shelf slopes gradually upward to the top of the mountain, its surface, as we saw it through the field-glasses, covered with rocks and low vegetation, its upper part passing behind a sort of false face to the cliff.

To return to our progress after we left Whitely's station. The way, which was very difficult and wearisome though at no point dangerous, was again over, under, and along more tree-roots, branches, and trunks, again over, under, and along more rocks and boulders, and over and up steep slopes of wet slippery mud,—tree, rock, and mud being alike wrapped in the usual covering of wet moss. Over such ground as this we made our way round the three spurs, and at last came in sight of the part of the ledge on to which falls the stream from above. A fairly gentle slope, covered with coarse grass, taller than ourselves, led down, for a considerable distance, to the actual point on to which the water fell, which to our great delight, we saw was no deep impassable pool or ravine, but a broad, sloping reach of broken rocks; on the other side of this the ledge sloped almost as gradually upward, but this upward slope consisted for some distance of a slippery expanse of rock, broken by faintly marked step-like ledges, over the whole of which in the heavy rainy season a continuous flood of water must pour, but which was now almost dry. At last the way to the top lay before us clear and, if somewhat difficult, certainly passable.

We hurried down the slope before us, cutting our way through the long grass as quickly as we could. Then we came to the fall, under which we had to walk for some 150 yards. Luckily, comparatively little

water was coming over at the time ; and this, descending from the great height of two thousand feet, fell upon us only as very heavy rain. In wet weather—and even two or three hours of rain, as we sometimes saw, swell these streams in a wonderful way—it would probably be quite impossible to walk under this fall, though even then it would perhaps be just possible to walk behind it, between it and the cliff, clinging closely to the face of the latter.

Just where the water fell on to the rocks grew in great abundance a low compact shrub, with small dense leafage and pretty little white flowers which I never saw anywhere else. The fall once passed we made our way up the slippery rocky part of the slope beyond, till we reached the upper part of the ledge, after its interruption by the cascade. This proved to be mainly covered by a dense growth of the *Brocchinia cordylinoïdes*, still very dwarf as compared with the habit of the same plant on the Kaieteur savannah ; and through this it was neither easy to make our way, simply by reason of the density of this plant growth, nor was it pleasant, by reason of the immense quantity of water which, held by the curiously arranged leaves of these plants, was poured over us as, in advancing, we crushed and sank into their leafage. Interspersed with this *Brocchinia*, almost on every inch of ground where the former was not, and indeed more abundantly than its rival plant as we neared the top of the ledge, were large quantities of the remarkable, dwarf, and compact yucca-like plant which we had noticed as one of the most prevalent forms of vegetation in the swamp near our house and had seen in very widely separated patches on the savannah even as far as the valley of the Arapu river. The exceedingly stiff habit of this plant and the very acute point on the top of each of its leaves, together with a reputation which we heard assigned to it—as, after much subsequent practical but involuntary experiment, I now believe most unjustly—of poisoning every wound which it might inflict, made us walk over it as over carefully arranged rosettes of poisoned daggers. But interspersed among these two most prominent plants was a vegetation new and lovely enough to reward much suffering. Of this the most striking plant was a gloriously beautiful crimson flowered *Befaria*, a small, very dwarf, and compact heath-like shrub with very dark-green leaves, thickly incrusting with many wide-open star-shaped flowers, each some half inch across and of the richest and most intense crimson. A second *Befaria*, pink-flowered, was also either new to me or at least a much more dwarf and at the same time a very much larger-flowered variety of a species occurring in the swamp below. Another tiny shrub had its leafage and wiry stems completely obscured by wonderfully large pink flowers, clustered and shaped after the manner of those of the rhododendron. A curious fritillary-like flower was in abundance ; and there were numerous small and delicately pretty, but not showy, ground orchids. The pitcher-plant (*Heliamphora*) was there too in

abundance, and of a size and luxuriance so far surpassing its habit in the El Dorado swamp that it seemed to us a new plant.

Up this part of the slope we made our way with comparative ease till we reached a point where one step more would bring our eyes on a level with the top—and we should see what had never been seen since the world began; should see that of which, if it cannot be said all the world has wondered, at least many people have long and earnestly wondered; should see that of which all the few, white men or red, whose eyes had ever rested on the mountain had declared would never be seen while the world lasts—should learn what is on top of Roraima.

Then the step was taken—and we saw surely as strange a sight, regarded simply as a product of nature, as may be seen in this world; nay, it would probably not be rash to assert that very few sights even as strange can be seen. The first impression was one of inability mentally to grasp such surroundings; the next that one was entering on some strange country of nightmares for which an appropriate and wildly fantastic landscape had been formed, some dreadful and stormy day, when, in their mid career, the broken and chaotic clouds had been stiffened in a single instant into stone. For all around were rocks and pinnacles of rocks of seemingly impossibly fantastic forms, standing in apparently impossibly fantastic ways—nay, placed one on or next to the other in positions seeming to defy every law of gravity—rocks in groups, rocks standing singly, rocks in terraces, rocks as columns, rocks as walls and rocks as pyramids, rocks ridiculous at every point with countless apparent caricatures of the faces and forms of men and animals, apparent caricatures of umbrellas, tortoises, churches, cannons, and of innumerable other most incongruous and unexpected objects. And between the rocks were level spaces, never of great extent, of pure yellow sand, with streamlets and little waterfalls and pools and shallow lakelets of pure water; and in some places there were little marshes filled with low scanty and bristling vegetation. And here and there, alike on level space and jutting from some crevice in the rock, were small shrubs, in form like miniature trees, but all apparently of one species. Not a tree was there; no animal life was visible, or it even seemed, so intensely quiet and undisturbed did the place look, ever had been there. Look where one would, on every side it was the same; and climb what high rock one liked, in every direction as far as the eye could see was this same wildly extraordinary scenery.

To complete such picture as I am here able to give of the scenery on the top of Roraima some few words further concerning the vegetation there occurring seem necessary, even though all details of this subject must be deferred to a future occasion. It has been said that the general character of all the plants there present is dwarf; it may be added that it is in this respect almost alpine. It almost all occurs in the little swamps, on level water-saturated ground, to which reference has already

been made; but a very few plants, hardly differing in character from those on these levels, occur in the crevices of the rocks. Those on the level ground appearing to the eye from a distance to be grasses, are in reality chiefly one or two species of grass-like *Pæpalanthus*; a few real grasses occur; great quantities of most splendid and luxuriant pitcher-plant (*Heliamphora*) and of the yucca-like plant said to be poisonous. An interesting feature connected with this latter plant was that on the summit of the mountain this plant was in full flower, though only expended seed-pods were visible on it below; and its yellow crowns of flowers surmounting the tall stiff stalks, which in external appearance may be very closely likened, both as to form and colour, to that of the well-known Crown Imperial (*Fritillaria imperialis*) at home, were sufficiently abundant and remarkable to lend a character of their own to the scene. Most, if not all, of the lovely flowering plants already described as occurring at the top of the ledge were also very abundant on the top; from which latter place, indeed, they had probably originally reached the ledge. The stunted tree-like character of the only shrub, five to six feet in height, occurring on the summit has already been mentioned. As regards the very scanty vegetation in the crevices of the rocks, this was almost entirely composed of two or three insignificant ferns, resembling in external character the European *Asplenium septentrionale*, and of a most exquisite and large flowered *Utricularia*, one of the three species to which I shall have to refer fully in dealing in another paper with the plants of Roraima.

Only after some time was the perception felt that there was after all some trace of order in this apparent disorder. What this order is, is rather difficult to explain briefly. The top of the mountain seems to be not, as was supposed, quite flat, but to have the form of a basin, very shallow relatively to its extent, its edge being formed by the actual rugged edge of the cliff. The surface of this basin seems to be divided up, in a manner which if it were artificial would be very irregular, but which as the work of nature is singularly regular, into a vast number of much smaller, yet still very shallow basins, these small depressions forming the amphitheatre-like level spaces, of which I have already spoken, the separating walls between them being represented by the curiously terraced ridges of rock, which, it appeared, are really irregularly semilunar, or even in some cases ring-like, in arrangement.

Moreover it is to be remarked that of these ridges each is of by no means one height throughout its extent; each of them, like a miniature mountain chain, rises, at curiously regular intervals, to form rugged pinnacles or pyramids, up the sides of which the rude step-like terracing, just as elsewhere along the ridge, generally runs, as though to offer a means of access to the traveller even up to the highest points.

The greatest depth of the general basin occupying the whole top of Roraima we had no means of ascertaining; nor can I estimate the depth

of the smaller basins in other parts than those seen by us. Elsewhere they may possibly be of considerable depth, forming large receptacles or ponds of water. But where we were I should say that the actual greatest depth of none of them was more than from 10 to 20 feet, and that they varied in diameter, roughly speaking, from 100 to 500 yards. The height of the highest pinnacle we measured, this one being the highest we saw, was about 80 feet.

These basins or depressions hold a considerable quantity of water, some of this being visible in the many small streams and pools described, much more being stored in the super-saturated vegetation of the marshes. Moreover the very rocks which bound these basins are themselves saturated and super-saturated even up to their highest points with water, which, constantly percolating slowly down into the basins, is constantly renewed from atmospheric sources. Even at the time of our visit, after so long a dry season, rock and hollow alike were almost full of water; so that but little was then flowing from them over the cliff-face to fall below, yet each single, not very heavy, shower of rain sufficed to swell the water in them to such an extent that the cascades over the cliff at once became of considerable size. It should be added that the edge of the cliff is not, as it appears from below, an even line, but is cut at right angles by various more or less deep channels, which, shielded from observation from below by the fact that they often pass parallel to the cliff behind false faces to the cliff, allow an outflow of water from the summit of the mountain down the cliff long before the water has reached the actual average level of the edge of the cliff.

These circumstances sufficiently explain most of the phenomena noticed from below by previous travellers. They explain the constant flow of water over the cliff, the rapid increase of this flow at certain intervals, and the rhythmic, intermittent or wave-like nature of the overflow in dry weather—for this latter phenomenon is evidently due to the fact that the water, which is not at those times at a sufficient level to reach the points of overflow, is then blown at short intervals from the surface of the shallow pools by the varying force of the breezes which are almost continually battling over the top of the mountain. They explain also Robert Schomburgk's statement that the water seems to flow not from the top of the cliff but from points some distance below; for the water flows through deep and narrow sloping channels, which it has cut for itself so as to issue at some distance down the face of the cliff, the channels themselves being indiscernible from below, sometimes because they are lost to sight in the general irregularity of the rock surface, sometimes because issuing from behind a false face to some portion of the cliff.

The one observation of previous travellers which I find it somewhat difficult to reconcile with facts, is that in which it has frequently been asserted, that the top is covered with trees. As regards the northern

end of the mountain, as I have not seen this, I cannot positively assert that there are no trees on it. But the remark has chiefly been made with reference to the southern end, at the point at which we ascended. I can only suppose that previous travellers, obtaining only a distant view, have mistaken the many and extraordinarily rugged pinnacles and points of rocks for the tops of trees.

Small fleeting masses of clouds were passing over the top during the whole of our visit, though it was a fine and otherwise a bright day. So many and changing were these clouds that I only managed to secure sketches by seating myself on a high pinnacle of rock from which four or five interesting points were visible at once, and turning to sketch each of these as each in turn became visible. I suppose that there are few days in the year when it is really clear on the top of Roraima. And these constant mists and the frequently prevailing heavy clouds and rain-storms, together with the constant and varying, but ever powerful winds, account for the super-saturation with water of everything on Roraima. Furthermore, the soft sandstone rock, always thus saturated and always exposed to the strong blasts of many winds, owes its fashioning into its very remarkable forms simply to extraordinarily active aerial denudation.

There would be great difficulty, almost amounting under present circumstances to impossibility, and only to be overcome by a very considerable expenditure of time and money, in clearing the path through the forest slope and up the ledge so as at least to be able to carry up hammocks and provisions, so as to be able to remain for a night on Roraima, or even to sleep at any point much nearer the top than "our house." It is also equally impossible to reach the top early enough in the day to explore more than a certain short distance from the point first reached. As far, however, as I could see from the summits of the tallest pinnacles, and this is no inconsiderable distance, the character of the whole of Roraima is that of the part more directly examined. And the summit of the neighbouring mountain of Kukenam, visible from Roraima because considerably lower than that mountain, is also of the same character.

There is no need to describe our climb down the mountain to our house. Once there, it became necessary to consider our further plans—whether to ascend again from this same point; or to proceed round the mountain with a view, not of trying any new point of ascent, but of ascertaining the practicability of such attempts in the future; or whether, satisfying ourselves with the fair measure of success with which we had already met, to turn homeward. The growing scarcity of provisions, the even much more serious exhaustion of our stock of beads, gunpowder, and other articles of barter, and the increasing symptoms of ill-health which I and some others of the party had for some time felt, decided me in favour of a return homeward.

Till the 24th of December we remained at our house on Roraima, occupied in finishing the various sketches, measurements, collections, and other tasks which we had undertaken. Then, on Christmas Eve, we descended to the village of Teruta, where we found that, without any prompting from us, the Arekunas had built a very large new house for us to spend our Christmas in.

Christmas Day at Teruta was wet and gloomy as far as the weather was concerned. By the evening the fall of the Kukenam river and the two falls, of the Kamaiwa and of the nameless river on to the ledge, had swollen to a very great size, so that the sound of their thunder was heard loud and far; and in addition to them eight other cascades, most of them hardly discernible in ordinary weather, now fell in great volume down the face of Roraima alone.

One other feature of that day deserves record. The *Cattleya* before mentioned had been brought to Siedl in enormous quantities and in splendid flower; and to us too it had been similarly brought until, fearing to increase our already too bulky baggage, I declined to take more. It grows abundantly, not far up Roraima, but along the bed of the Kukenam and other rivers, at the foot of that mountain, at an elevation of from 3700 feet to perhaps 4000 feet. Each walk by the side of these streams disclosed abundant specimens. But on Christmas Day I was lucky enough from one tree, overhanging the bathing pool in the Kukenam, close to Teruta, to collect two most glorious clumps of this orchid, the better of the two having five spikes of flower, of which one bore nine, each of the others eight, blossoms, in all forty-one of some of the largest and finest coloured *Cattleya* flowers ever seen, on a single small plant, the roots of which easily lay on my extended hand. Our Christmas decoration then, consisting of an enormous pile of these flowers, was a fitting farewell to the glorious flower forms of Roraima.

The next morning we started homeward, and returning along our old path, after some serious misfortunes, causing much delay, and not a few adventures, which must be told, if ever, on some future occasion, we reached our old starting-place at the junction of the Essequibo and Mazaruni rivers on the 28th of January. Siedl, who left Roraima two days after we did, arrived at this same point two days after us.

Notes on a Journey to Mount Roraima, British Guiana.

By H. I. PERKINS.

(Read at the Evening Meeting, April 27th, 1885.)

Map, p. 560.

I HAD some hesitation in accepting the invitation to address you this evening on the subject of the ascent of Mount Roraima, not that I fail to appreciate the honour which it confers upon me, but I am conscious that in doing so, I am standing in the position which should be occupied by the originator and chief of the expedition, in which I took only the secondary part. However, as it has been represented to me that a brief narrative of the principal events of our journey would be of interest at the present moment, I will endeavour to give it to you in a condensed form, and I must ask you not to consider it as in any way forestalling the more complete and detailed account from the able pen of Mr. im Thurn, which will doubtless shortly be laid before the Society.

In every previous case where travellers had succeeded in reaching the vicinity of the mountain, they had been compelled to retrace their steps almost immediately owing to want of food. Profiting by these adverse experiences, we took care to guard against a like misfortune befalling us, by so timing our expedition as to arrive when the fields of cassava, the staple food of the Indians, were ready for harvest, and thanks to the modern improvements in the matter of tinned meats, we were not at the mercy of the native hunters.

Leaving Georgetown on the 14th October, I joined Mr. im Thurn for the long inland journey to the mountain, at Bartica Grove, a small missionary settlement at the confluence of the Mazaruni and Essequibo rivers, on the evening of the same day.

Two days later we commenced our journey, our party consisting of eighteen hands—Indians and half-breeds—distributed amongst three boats. We took three pilots with us in an extra boat as far as the head of the set of rapids and falls that lies between Bartica Grove and the mouth of the Potaro river. At the falls the Essequibo is about two to three miles in width, is broken up into numerous narrow channels by small islands and rocks, which render the navigation at once difficult and dangerous, though nature seems to have attempted to make up for it by increasing the beauty of the country; for one sees in places delicious cool shady retreats where the smooth dark mahogany coloured water, intensified in its tint almost to blackness, reflects the overhanging branches of the trees and the short stretches of silvery white sand that edge the stream; and again, in contrast, spots where the bright tropical sun blazes down fiercely on a mass of rushing seething waters, that whirl and eddy and foam in their efforts to pass the sharp rugged rocks that bar their passage to the sea. Above the falls, as it was the dry

season, we saw huge yellow sandbanks extending for miles, and as the boats passed close to them we saw the tracks made by the fresh-water turtles whilst in search of some convenient place to deposit their eggs.

From Gluck Island we made the best of our time, travelling daily till we reached the mouth of the Potaro river on the 21st, when we slept at the foot of the Tumatamari cataract, about six miles up. This took us the whole of the ensuing day to ascend, owing to the size and number of the boats and packages. On Thursday the 23rd we arrived at the Ichowra Mission, established in 1881 by the Rev. W. E. Pierce, who lost his life on his return journey to the Grove in the Marihi Falls of the Essequibo river in September of the same year.

We had calculated on obtaining as many extra hands, and boats of a size smaller and more convenient than our own, as we might require, from the large number of Indians who had come from various localities to meet the Bishop of Guiana and his party who were then visiting Ichowra; but here we were slightly disappointed, for though we were fortunate in the men who took service under us, we could not get anything approaching the number we actually wanted; and this led to many delays, which shortened our visit at the mountain itself, as our stock of provisions was necessarily diminished while real progress was not being made. Perhaps our greatest piece of good fortune was in securing the services of a Makusi Indian chief named "Laink," "Lonk," or "Long," whose village, containing some 300 or 400 persons, is situated on a hill summit near the Ireng river, about 10 miles from Mount Curiaring, and is called Konkarmo. He promised to see us safely there, and gave us his word that he would get us some Arekuna Indians to take us thence to Roraima itself.

We had determined to go by water to Chinebowie, an Indian village on the Potaro river, about a day and a half's journey from the Kaieteur Fall, and to walk thence to Roraima. With this idea we left Ichowra on Monday, October 27th, and by nightfall had reached the foot of the Pacatout Cataract, where we camped. Early on the next day we repaired the path across the portage, which is about half a mile in length, putting down rollers or logs of wood wherever required, to assist the boats in their passage over the ground, and, that finished, transported most of the baggage to the further end of the path.

The boats had now to be taken over, but this had to be put off till the following day, when we left Pacatout, and reached Amutu Fall, where we found the portage path blocked and in a state of disorder, which took us quite half a day to clear up, and we then took the two smaller boats and their cargoes over to the other side above the cataract.

Unfortunately we had to leave our biggest boat behind here, for it came into contact with a sharp-pointed tacuba—dead, fallen, hard-wood tree—which ripped a hole in its side, and rendered it quite useless for the time; so we proceeded on our journey in the other two the same day

as far as Warrotu Cataract, and on from thence to the Tukoie landing, which is, so to speak, at the foot of the Kaieteur Fall, though, in reality, it is about $2\frac{1}{2}$ miles away from the fall by a rough bush path. We at once sent back the boats to bring on the rest of the baggage and the remainder of the hands whom we had left in charge at Amutu.

On the 3rd of November we moved our camp from Tukoie to the top of the Kaieteur Fall of the Potaro river, to a spot about 150 yards from its actual edge. Here we remained four days and a half whilst the men were bringing the loads from Tukoie landing to our camp.

Close to our camp we found two corials or canoes made of whole trees with the heart dug out and opened wide by artificial means. They belonged to an Indian at Chinebowie, to which place we were bound, so packing them as full as we safely could we left the Kaieteur on Friday, November 7th, and reached Chinebowie the following day, where we were detained five days and a half, whilst the remainder of the luggage left behind at the waterfall was being brought to us.

Here, I regret to say, I was obliged to leave my chronometer, which afterwards deterred me from taking observations for longitude. I had tried my utmost to obtain a chronometer watch for this purpose, but had been unsuccessful, and there was insufficient time to get one from England, so as a last resource I had to get a ship's chronometer, which required an immense amount of care when carried about, and I could not therefore trust any one with it, but had to carry it always myself. I had been able to protect it against any sudden jars whilst we were travelling in the boats, but afterwards, during the journey from Tukore landing to the Kaieteur, I experienced the greatest difficulty in carrying it safely, more particularly in the steepest portions of the path, where it was by no means easy to walk even when untrammelled by such a thing as a chronometer, and here it got several severe jolts, so that I saw at once it would be hopeless to expect the instrument to maintain its regularity of rate, which was at the time I received it almost infinitesimal, losing a tenth of a second per day, and determined to leave it at the first safe place we met with.

We left Chinebowie on the 14th of November, and had for the first three days to walk through the bush, our course being for the first two days south-west by west, and afterwards, on the third, due south-west, along southern spurs of the Pacaraima Mountains, camping each night at the side of a small stream, and tying our hammocks to the trees with a piece of waterproof cloth stretched over them as a protection from the rain and night dews.

On the 16th we reached Araiwaparu Partamona village, of three houses, situated on the side of a lofty hill some 2000 feet high, and stayed there the whole of the next day in order to rest the men, who were tired by their walk through the forest and in great need of a halt.

Resuming our journey on the 18th, our path led us through a magni-

ficient savannah country resembling the English downs, rolling away for miles and miles on all sides, some of the hill-tops being quite 2500 feet above the level of the sea. The savannah grass, of which there are several kinds, does not grow to any great length, and consequently the walking is extremely enjoyable, as there are no trees to impede one's progress, and there is no necessity, as is the case in bush walking, to be constantly on the alert for overhanging branches that impede one's way.

The types of feature amongst the Partamonas are not attractive, the men having for the most part large mouths and flattish noses with small unintelligent eyes, and longish wild unkempt hair, in which they present a great contrast to the Makusi Indians, who are, as a rule, handsome men, and wear their thick straight black hair neatly and evenly cut by a razor. Some of the Partamona women are when young not ill-looking, and we noticed some who were quite pretty; neither men nor women wear a superabundance of clothing, a loin-cloth or lap, and sandals made of the leaf stem of the Eta palm constitute the dress of the men, while the women content themselves with a broad bead apron of red, white, and blue beads; the splendid thick hair of both sexes furnishes an ample protection from sunstroke.

Indians always look their best when in their natural costume, but most of them, if not all, dearly love to wear European clothes which never become them. Their houses are cone-shaped and quite watertight; the conical roof rests on a circular wall of kneaded clay, and is also supported by a pole in the centre, and is generally composed of the leaves of the Eta palm (*Mauritia flexuosa*), neatly laid one over the other. There are no windows to these dwellings and consequently it is nearly always pitch dark inside, for the only means of lighting are by two doors, one large one in front and a smaller one in a direct line opposite to it at the back of the house; this latter is made for the women and children to escape by in the case of any unwelcome visitor or enemy appearing at the front. They light fires all over the floor, not unfrequently one under each hammock, and the roof in consequence is of a glossy black, which preserves the leaves as the smoke drives away the larvæ of insects that feed on them, and keeps the house quite dry and warm.

In the morning we always experienced a cold biting north-east wind that seemed to die away as the sun rose, and changed to the southward as the day grew warmer.

We learnt from Lonk that we were quite close to his village, which we reached the following day, the 19th, travelling in a southerly direction some 12½ miles from Euworra-eng. It is placed on a hill-top, but the view is shut in on all sides by greater heights. We were greeted with great cordiality by the whole population, some 300 in number, each of whom, men, women, and children, insisted on shaking hands with us.

The morning after our arrival at Konkarmo, we paid off the Makusis whom we had employed from Ichowra, and induced Lonk to send thirty of his men back to Chinebowie along with three of the Partamonas from Euworra-eng to bring on the rest of our baggage, left behind for want of porters.

On the Sunday following, the 23rd of November, we paid a visit to the Ireng river which flows at about four miles' distance from the settlement in an easterly direction through the savannah. It is here about 120 yards wide, and was then extremely shallow from the drought, but was a beautiful sight; to the right a small cataract was surging and foaming, and below it the froth floating down rapidly between the pretty stretches of white sand and banks of red jasper pebbles looked like lovely white birds in the bright sunlight.

Near the river we obtained pieces of a dark coloured rock, a kind of serpentine, of a purple hue, called by the inhabitants of the district yarowah, and worked by them (by Lonk's immediate relations in particular) into stone axes and toys such as whistles and models of chrysalises and bottles and animals. They do not now use these stone implements for domestic purposes, as they procure those of iron manufacture from the Portuguese traders on the Rio Branco and elsewhere. This art of stone implement making seems to have been kept alive in Lonk's family from time immemorial, for on our asking him where he had learnt to make stone axes, he replied that his fathers had done so before him, and the process had been taught by father to son for generations.

So far as we could discover, the following seems to be the usual method adopted by these people in making these things. They nearly always select a stone which in its rough state almost resembles the object they desire to manufacture, and when this is not possible the stone is worked into an approximation of the required shape by chipping with a knife or cutlass, in the absence of which a harder sharp-edged stone would be used; when this has sufficiently reduced the size of it, it is rubbed on another rock harder than itself, by which means the rough exterior changes into large triangular or oblong facets whose edges are again ground till other and smaller facets are formed, and this process continues until the stone becomes of the right form and weight, and the rough edges then remaining are removed by a gentler friction, which leaves the finished implement quite smooth.

Lonk made for im Thurn a stone axe, a whistle, and two models, one of a fish and one of a bottle, also a very good imitation of a chrysalis, but he would not go with us when we went to the Ireng on the Sunday as he demurred on the ground that it was God's day, and he said he would have to hold service in his church, a neat structure of wood built on log pillars about three feet from the ground, with a clean-looking floor of beaten bark, and roofed with the Eta palm leaves. It is about

60 feet long by 25 feet broad, provided with benches made of whole logs of wood, and an altar with two or three steps leading up to it; the entrances, of which there are two, are furnished with large notched logs to serve as steps. In this edifice Lonk used to hold service from three to five and six times a day, according as his fancy took him, notice having been previously given by blowing a cow's horn, obtained from the Brazilian cattle farms. The service consisted of the Lord's Prayer, the Creed, and the Ten Commandments being read aloud by Lunk, and repeated by all the worshippers in the Makusi language, who had learnt the words by hearing them said frequently.

Lonk probably acquired his knowledge at the Potaro Mission, and found it added greatly to his importance among his fellow tribesmen, though it would perhaps be unfair to say he made any illicit use of his access of power.

So frequently were the services held that it was often difficult to obtain men to work, and particularly so when we required a huntsman to procure fresh meat for us; however, that was not so great a nuisance as when they began to say the Commandments, &c., over to each other at 2 o'clock in the morning, as frequently happened, for then there was no possible chance of sleep.

On Wednesday, November 26th, the men sent to Chinebowie returned with the rest of the baggage, and in the meantime the Arekunas who were to take us to the mountain put in an appearance; their chief, a dirty looking ruffian named John, affirmed positively that he knew the way perfectly, but we were deceived by him, for when we had crossed the Cotinga or Quateng river, about two days and a half's journey distance from Roraima, he showed an utter ignorance of the path.

The first night from Konkarmo, which we left on the 28th of November, we slept at Wutsa, after a march of 12 miles; the country being savannah land the whole way to Roraima of the same undulating character as we had first met on leaving Araiwaparu. Sunday, the 30th, we reached the Cotinga or Quateng river, which forms part of the boundary between British Guiana and Brazil. It is a sluggish stream with high clay and sand banks, and rises north of Roraima.

The 1st of December, our first day in Brazilian territory, we camped to the south-west of, and quite close to Waetipu, a splendid mountain towering above the general level of the tableland some 3000 or 4000 feet, with bold sharp outlines ending in a well-defined peak, on its south side free from forest, the savannah continuing quite up to its summit, though densely wooded on its N.N.E. and north-west.

From a lofty range of hills some 3600 feet high, we had a splendid view of Waetipu, Roraima, Kukenam, Marima, and two small mountains near Waetipu, named Hormi and Mucuripa; the curious square flat tops of Roraima and Kukenam, with their dark precipitous cliffs, adding a grand and peculiar effect to the whole landscape. On the 2nd of

December we arrived at Toroiking or Ipelemuta, an Arekuna village of four houses situated on the left bank of the Arapu river.

Here we made the acquaintance of the Arekuna chief, a fine old man of about sixty, named Simon, with his son and other children, as he called them, though they numbered at least fifty, who, he informed us, were at our service, and some half-dozen of whom we afterwards employed to cut a path for us on the mountain itself. John our Arekuna guide now said he knew the path no further, and in consequence Mr. im Thurn engaged some of Simon's children to carry our loads to Teruta, a village at the foot of Roraima, about eight or nine miles to the west of Toroiking, which we entered on the 4th.

The view from here is magnificent, as the village is placed just in front of Roraima, giving a sight also of Kukenam; it is situated on a high hill 3751 feet above sea-level, but is dwarfed by the gigantic walls of rock near it, Roraima being about four, and Kukenam about three miles from it. Each mountain seems like a huge impregnable fortress, built on a mountain top 7000 feet high, with walls from 1200 to 1800 feet in height.

The portion of Roraima facing Teruta is four miles long, and of Kukenam about the same. In wet weather their summits are wrapped in dark clouds, and after the rain is over and the clouds have dispersed the water can be seen casting itself over the cliffs in splendid falls that only by being seen can be at all imagined. At a distance of four to five miles they look like delicate white threads against the dark background of sandstone rock. The two mountains are separated by a wide gorge, and in this clouds of dense white mist accumulate, and gradually creeping up as the day advances enshroud their summits something after the manner of the "tablecloth" of Table Mountain.

On six different occasions had the mountain been visited before this journey of ours.

In November 1838 it was discovered and its position determined by the brothers Robert and Richard Schomburgk, who stayed some twenty-five days in its neighbourhood and who visited the same spot below the summit as ourselves, for we met an old Indian woman at Teruta village at the foot of Roraima, who pointed out where "Sambrook," as she called them, had been. It was next seen in 1869 or 1870 by Mr. Chas. Brown, who was employed about that time by the Government of British Guiana to make a geological survey of the colony. He did not go to the same point as we did, and had to retire after a day's stay, from want of provisions. Messrs. Boddam-Whetham and McTurk attempted to scale the mountain in 1877. They saw the ledge by which we reached the top, but deemed it impracticable of ascent, owing to two apparent interruptions in its course. Their food supply also would not permit of a long stay and they had to retire unsuccessful.

Soon after this Messrs. Flint and Eddington, two travellers in British

Guiana visited the mountain. They also, I believe, saw the ledge, and fearing the same difficulties as Messrs. Boddam-Whetham and McTurk, did not attempt the climb. Then Mr. Whitely in 1883, whilst collecting birds in the district, built himself a hut on the mountain side, and cut a path to the face of the cliff. He saw the ledge, and in last year's August number of the Society's 'Proceedings' furnished a paper on his experience, illustrated by sketches, one of which is meant to represent this same ledge.

Very soon after Mr. Whitely left Roraima, Mr. Siedl, who had come to collect orchids, &c., arrived at the mountain in February 1884, where we found him, when on his second visit, and took up our quarters close to him on the mountain side.

Roraima has not been seen on every side, the north-west at present not having yet been viewed by any one, and it would perhaps be quite safe to say that no side but the south-western has been thoroughly scrutinised with a view to finding a means of access to the summit. For on the parts of the mountain other than the south-west there is dense forest, and the paths through this are at a distance of five or six miles or more from the cliff face, so that any one passing along these roads would be unable to see distinctly and clearly a ledge of small size against the cliff, if even able to see at all through the dense bush on all sides, and it is a curious fact that our ledge is on the most easily approached side of the mountain.

On this first visit to the upper portion of Roraima the ledge of rock appeared to us extremely easy to climb, except in two places: the first where the bush that covered the ledge appeared to end suddenly, leaving the cliff bare and naked, and giving the ledge the appearance of being interrupted, and consequently impassable; and in the second place where a waterfall from the summit falls on the ledge and has cut a gap in it, so that there seems to be a deep wide hole, which it would take great trouble to bridge over. But on the whole it seemed so easy to climb the mountain here that we concluded, as previous travellers had not attempted it, that there must be some insuperable difficulty of which we were not aware.

On the south and south-west sides, Roraima is for the most part devoid of trees. Teruta village lies, so to speak, at the foot of the mountain, though the cliff portion is about four miles distant. Between Teruta hill and Roraima flows the Kukenam river, which rises in Kukenam Mountain and descends from the summit in a splendid fall of about 1300 feet. From the Kukenam river Roraima slopes up at an angle of about 20° to 4500 feet, and then at 30° to the commencement of the forest-covered portion at 5890 feet; from here to the cliff face the incline is 15° steeper to about 7200 feet, and the remainder is perpendicular cliff. At about 5600 feet we found a large piece of swampy ground filled with most exquisite varieties of orchids and ferns, and also

the *Utricularia Humboldtii*, which grows to greater perfection here than on the Kaieteur savannah. Here also we found the *Heliamphora* or pitcher plant, whose cup-shaped leaves were full of water; it bears a delicate white flower without smell.

We reascended the mountain on Sunday, December 7th, and built our houses, one for ourselves and one for the men, at an altitude of 5405 feet above sea-level, close to Siedl's hut.

On the 10th, with Mr. Siedl, we went up a path cut by Mr. Whitely in 1883 to the face of the cliff, and on our way, at 6410 feet, found a lovely flowering plant, the *Leiothamnus Elizabethæ* of Schomburgk; it has deep carmine star-shaped flowers, with a white star centre, the points of which radiate down the petals. At 6841 feet we rediscovered another exquisite flower, first found by Richard Schomburgk, an *Utricularia*, with a large deep crimson blossom. The plant grows on the branches of trees and is about two to three inches in height; the bloom, when out, completely hides the stalk, and is about an inch and a quarter long by half an inch wide; sometimes there are two flowers on the same plant, but usually only one. The appearance of one of these bright blossoms on the sombre tree-branches has a most peculiar effect, and one's admiration is divided between the brightness of the flower and the wonderful energy of the tiny plant that produces it. Pursuing our way, we reached the cliff at 12 o'clock, nearly three hours from the start, the way being extremely rough and steep, over roots and trunks of trees and bare rocks; at times we could hear water running among the stones under our feet.

There are no trees of any very great size growing on that portion of the mountain, but the varieties of ferns are very numerous and beautiful, varying from small filmy to tall tree ferns, some 20 to 30 feet in height; but the plant that seemed to awaken for the time as much interest with us as any other was the *Rubus Schomburgkii*, or Roraima blackberry, which greatly resembles the English bramble; we gathered several bunches of the fruit, which possibly does get sweet, but none of those we obtained were at all eatable.

From the portion of the cliff reached we had a good view of the ledge we had seen on the 5th, and though partially obscured by the intervening bush it seemed quite easy of ascent.

The height we reached this day was 7350 feet, determined by boiling-point thermometer, and it took us $3\frac{3}{4}$ hours to return to our hut, a distance of about $2\frac{1}{2}$ miles, as we frequently stopped to collect ferns and other plants on our way.

On the 11th we ordered the Arkunas to cut a path to the foot of the ledge from the edge of the savannah, and if possible to continue it as far as the summit. After a day's work they returned, saying they had finished the road, but we afterwards found they had left off from fear of Makunaima, the great spirit, just at the point where the ledge joins the

upper sloping portion of the mountain. This was on the 14th, when we reached 7756 feet above sea-level, and found our way suddenly barred by a precipice of 120 feet. A heavy mist too arose, and it became bitterly cold, with the rain falling in torrents, which rendered our return journey dangerous, and the path slippery and muddy.

The next few days were occupied in surveying the country round the mountain and preserving plants; it was still too wet and slippery to enable us to make any further attempt on the mountain, but learning from Simon, the Arekuna chief of Toroiking, that the rainy season was about setting in, we determined to make use of the first fine morning we might have; and on the 18th December, which dawned most auspiciously for us, we left our house after an early breakfast at 7 A.M., reaching the cliff at 8.30, where we waited for about half an hour, and then set forward along the ledge, the path keeping much the same the whole way over rocks and roots and trunks of trees, and sometimes along the slippery leaning stems of the trees, using our hands and knees for some portion of the way.

The Arekunas we had with us hung back when we got thus far, and for a long while would not proceed until by dint of a great deal of persuasion, and the promise of a taste of ardent spirits, we prevailed on them to accompany us; we had, however, to send one of the men from the Pomerun, a half-negro half-Indian, to go first and lead the way, cutting a path as he went on. In this way we reached the waterfall, which to our great surprise we found extremely easy to pass, as the ledge was not cut away by the action of the water falling on it, and fortunately there was very little water coming over, being more like a very heavy shower, which wet us to the skin immediately. The foothold around the spot was extremely precarious, being worn quite smooth and slippery by the constant moisture and falling water.

From this fall to the top, the last portion of the ledge slopes at an angle of 30°, and is in places quite 20 or more yards in width; it is covered by a dense growth of moss, and in spots, tall coarse grass, which gives way here and there to flowering plants and small shrubs. Of the flowers one in particular, a species of heath, took our fancy by its dark pink blossoms of six petals, about the size of a halfpenny, which lay in quantities along our path. So occupied were we in securing each new treasure, that we had almost gained the top before being aware of it, for near the summit the ledge loses its steepness and is, so to speak, merged into the top itself.

A curious sight met our eager gaze as we passed the boundary line of the unknown; on all sides were grouped rocks of shapes unimaginable—weird, strange, and fantastic—first a row of huge oblong stones that looked like rude cannon placed there to guard the approach; further on another rock like a giant's umbrella on a short thick stem of about four or five feet in height, and others like miniature castles

and ruins of old churches, leaning so much that had they not been solidly connected portions of the enormous sandstone bed, they would have fallen. We saw no lake, however, but several pools of water here and there. The vegetation on the summit was extremely scanty and insignificant; there being no trees, only small bushes from three to six feet in height, growing at long intervals, and with the exception of a few scrubby orchids, two species of thick-leaved ferns, and a variety of the red *Utricularia* from below, there was no other plant there, owing no doubt to the absence of soil: for it is not possible for earth to collect on the summit as it would be almost immediately carried over by the rain-water which finds its way over the edge of the enormous cliff soon after it has fallen in most splendid waterfalls, some of which have a clear fall of 1500 feet.

We had no sooner accomplished the ascent than an impenetrable cloud of mist enveloped the whole of the upper part of the mountain, entirely obscuring the view, and rendering it difficult to see beyond 40 or 50 yards in any one direction, and putting a limit to our wanderings. After boiling the thermometer, which registered 197° Fahr., the average of five readings, and gave the height (allowing for difference of temperature from sea-level) as 8600 feet, we returned to our hut.

We left our house on the 22nd of December, and moved to Teruta, whence we proceeded as rapidly as possible to Konkarmo, Lonk's village, which we entered on the 31st of December, and found a large collection of Makusis from small villages near Konkarmo, engaged in making Christmas. We arrived at the Kaïeteur Fall on Friday, January 9th, 1885, and in Georgetown on the afternoon of the 31st, having been absent three months and sixteen days.

Should the further exploration of the summit of Roraima be ever determined upon, it would be necessary to take into consideration the difficulties to be encountered in reaching the top when carrying baggage, more or less heavy, for we found it a stiff enough climb untrammelled as we were with anything of the sort; moreover, the foundation of the path is composed mainly of a mass of loose rocks with deep crevices and holes between them over which is spread a network of tree roots on which one has to tread, and sometimes the way lies up the trunk of a fallen tree, where in damp weather the footing is extremely slippery.

Supposing, however, that every load had safely reached the top, one or more of the burdens being a tent, for it would be imperative to carry them as there are no trees to be found, and huts could not therefore be built, and hammocks, in which every traveller in that region sleeps, could not be slung up, but would have to be laid on the ground.

On account of the absence of trees also, it would be next to impossible to cook one's food, unless a kerosine stove were taken up, and it would require a very large and certainly too heavy a one to cook the salt fish

and rice on which the labourers, who would have to be numerous, as I shall show later, subsist.

Again, there is reason to believe the cold at night would be intense, for, as before stated, the average minimum night temperature was 49° , and once fell as low as 45° . This was inside the bush on the edge of the savannah, at only 5400 feet, where the huge cliff to some extent sheltered the spot. But on the top, 8200 feet higher, there would be nothing to stay the cold wind, and no fire to provide artificial heat; perhaps the white men of the party would not feel it so much as the blacks, and particularly the Indians, as the last named almost invariably light a fire near their hammocks before retiring for the night, and become quickly demoralised when they have to face the cold, and in the event of their becoming disheartened it would be adding greatly to the unpleasantness of the situation, if not necessitate a retreat.

So far as it was possible to discover, it appeared to us that it would not be easy, if at all feasible, to visit every part of this marvellous mountain, the flat top of which is at a rough estimation some 30 square miles in extent, without numerous appliances for ascending and descending the many small precipices into which the once flat surface has been worn. Ropes and rope-ladders would be required, and as there is nothing to fasten the ladders to, it would be necessary to have a number of men at the top to hold them while the others got down, and of course these men would have to be left behind until the return of the others. If this had to be done often, it would naturally take a large number of men for the purpose, though perhaps a way might be found by which the necessity for rope-ladders would be done away with; however, this would mean a long *détour* and consequent loss of time, which could be ill afforded, as the food supply would diminish steadily the whole time, and there would be no chance of replenishing it, except by obtaining fresh stores from below, as there are no animals whatever on the summit.

Another difficulty to be apprehended lies in the fact that the frequent and sudden mist that often envelopes the mountain, and is generally prevalent, would stop all excursions for the time being, for it is not possible to see more than 50 or 60 yards in any one direction when the day is foggy, and an exploring party would be in danger of losing sight of their camp if they attempted to wander any distance from it.

These few observations are based upon what we actually noticed when on the mountain-top; but as we were there only three hours, a more lengthened stay and actual experience of the difficulties mentioned may perhaps prove the task of exploring the whole of the summit of Roraima easier than I have conjectured it to be.

Previous to the reading of the foregoing,

The PRESIDENT (Lord ABERDARE) said it would doubtless be remembered that the expedition conducted by Mr. im Thurn to Roraima was suggested by Sir Joseph Hooker, and that the Royal Geographical Society, the Royal Society, and the British

Association took an interest in it and found the necessary funds. Mr. im Thurn was accompanied by Mr. Perkins, who had written a paper giving an account of the expedition. Mr. Perkins had not accepted the invitation to prepare the paper without hesitation, inasmuch as he was naturally reluctant to do anything which might seem to anticipate the interest with which Mr. im Thurn's account of the expedition would be received; but he had skilfully contrived to give an account of the nature of the journey without forestalling the more scientific details which it was hoped Mr. im Thurn himself would give; unfortunately Mr. im Thurn was taken ill on his return to the coast. Mount Roraima had long presented an interesting problem to geographers and natural philosophers. It was known to be an isolated mountain nearly 9000 feet in height, the last 1500 to 2000 of which was a precipice up which it was supposed to be impossible to climb. It was surrounded by a number of other isolated mountains of a similar character, but Roraima was the highest of them all. Sir Joseph Hooker and others expected that a careful examination of the top of the plateau would afford some very interesting results. It was considered probable that the flora would be different from that of the plain, and similar to that which existed in old time. To some extent these anticipations had been rewarded by the discoveries made by Mr. im Thurn. The obstacles to reaching the top and remaining there were very great, but no doubt, now that Mr. im Thurn had led the way, others would follow, and before many years were passed an exhaustive examination would be made of the lofty plateau.

After the paper,

Sir JOSEPH HOOKER congratulated the Society upon the clear and unpretending account which had just been read of the expedition to Mount Roraima. That mountain had for forty years engaged his attention. He first heard of it from his friend Mr. Robert Schomburgk on his return from exploration in that region. He had long hoped that the time would come when some visitor to Guiana would be sufficiently instructed and educated to make good use of the expedition to the mountain. Mr. im Thurn was a public school boy at Marlborough, and was the life and soul of the natural history class there. Being desirous of pursuing natural history he applied to him (Sir Joseph Hooker) for an appointment, and he obtained for him the position of Curator at the Guiana Museum. That he exchanged for a magistracy up the Pomerun river, where he was within reach of Mount Roraima. He (Sir Joseph Hooker) wrote to him and said, "Did it never occur to you that the mountain may be ascended?" and the reply received was, "I am sure it can be, but it will cost a great deal of money." He wrote again to him saying that he was sure the Royal Geographical Society and the Council of the Royal Society would readily engage to make up any loss in the matter of funds, to which Mr. im Thurn replied that his own resources would be willingly placed at the disposal of the expedition. Unfortunately Mr. im Thurn had been taken ill, and he had only received two letters from him since his return from the mountain, both written in pencil in his hammock.* His collections would be of great value ethnographically, botanically, and geologically. Mount Roraima resembled the Khasia Mountains near the Bay of Bengal, which rose abruptly about 200 miles from the sea and extended for 400 miles. On the top of those mountains 600 inches of rain fell annually, and there was no vegetation except tufted grass. There were also remarkable rocks, weather-worn by the rain. The Khasia Mountains were gneiss and granite, but Mount Roraima was sandstone. In conclusion he expressed an earnest hope that ere long Mr. im Thurn would be able to supplement the paper that had been read by Mr. Perkins.

* M. im Thurn's paper (*ante*, p. 497) was not received until after the close of the Session.—[Ed.]

System of Orthography for Native Names of Places.

TAKING into consideration the present want of a system of geographical orthography, and the consequent confusion and variety that exist in the mode of spelling in English maps, the Council of the Royal Geographical Society have adopted the following rules for such geographical names as are not, in the countries to which they belong, written in the Roman character. These rules are identical with those adopted for the Admiralty charts, and will henceforth be used in all publications of the Society.

1. No change will be made in the orthography of foreign names in countries which use Roman letters: thus Spanish, Portuguese, Dutch, &c., names will be spelt as by the respective nations.

2. Neither will any change be made in the spelling of such names in languages which are not written in Roman character as have become by long usage familiar to English readers: thus Calcutta, Cutch, Celebes, Mecca, &c., will be retained in their present form.

3. The true sound of the word as locally pronounced will be taken as the basis of the spelling.

4. An approximation, however, to the sound is alone aimed at. A system which would attempt to represent the more delicate inflections of sound and accent would be so complicated as only to defeat itself. Those who desire a more accurate pronunciation of the written name must learn it on the spot by a study of local accent and peculiarities.

5. The broad features of the system are that vowels are pronounced as in Italian and consonants as in English.

6. One accent only is used, the acute, to denote the syllable on which stress is laid. This is very important, as the sounds of many names are entirely altered by the misplacement of this "stress."

7. Every letter is pronounced. When two vowels come together, each one is sounded, though the result, when spoken quickly, is sometimes scarcely to be distinguished from a single sound, as in *ai, au, ei*.

8. Indian names are accepted as spelt in Hunter's Gazetteer.

The amplification of the rules is given below:—

Letters.	Pronunciation and Remarks.	Examples.
a	<i>ah</i> , <i>a</i> as in <i>father</i>	Java, Banána, Somáli, Bari.
e	<i>eh</i> , <i>e</i> as in <i>benefit</i>	Tel-el-Kebir, Oléleh, Yezo, Medina, Levúka, Peru.
i	English <i>e</i> ; <i>i</i> as in <i>ratine</i> ; the sound of <i>ee</i> in <i>beet</i> Thus, not <i>Feejee</i> , but	Fiji, Hindi.
o	<i>o</i> as in <i>mote</i>	Tokio.
u	long <i>u</i> as in <i>flute</i> ; the sound of <i>oo</i> in <i>boot</i> . Thus, not <i>Zooloo</i> , but	Zulu, Sumatra.
	All vowels are shortened in sound by doubling the following consonant.	Yurra, Tanna, Mecca, Jidda, Bonny.

Letters.	Pronunciation and Remarks.	Examples.
	Doubling of a vowel is only necessary where there is a distinct repetition of the single sound.	Nuulúa, Oosima.
ai	English <i>i</i> as in <i>ice</i>	Shanghai.
au	<i>ow</i> as in <i>how</i> Thus, not <i>Foochow</i> , but	Fuchau.
ao	is slightly different from above	Macao.
ei	is the sound of the two Italian vowels, but is frequently slurred over, when it is scarcely to be distinguished from <i>ey</i> in the English <i>they</i> .	Beirút, Beilúf.
b	English <i>b</i> .	
c	is always soft, but is so nearly the sound of <i>s</i> that it should be seldom used. If <i>Celebes</i> were not already recognised it would be written <i>Selobes</i> .	Celebes.
ch	is always soft as in <i>church</i>	Chingchin.
d	English <i>d</i> .	
f	English <i>f</i> . <i>ph</i> should not be used for the sound of <i>f</i> Thus, not <i>Huiphong</i> , but	Haifong, Nafa.
g	is always hard. (Soft <i>g</i> is given by <i>j</i>)	Galápagos.
h	is always pronounced when inserted.	
j	English <i>j</i> . <i>Dj</i> should never be put for this sound.	Japan, Jinchuen.
k	English <i>k</i> . It should always be put for the hard <i>c</i> Thus, not <i>Corea</i> , but	Korea.
kh	The Oriental guttural	Khan.
gh	is another guttural, as in the Turkish	Dagh, Ghazi.
l	{ As in English.	
n		
ng	has two separate sounds, the one hard as in the English word <i>finger</i> , the other as in <i>singer</i> . As these two sounds are rarely employed in the same locality, no attempt is made to distinguish between them.	
p	As in English.	
q	should never be employed; <i>qu</i> is given as <i>koo</i>	Kwangtung.
r	{ As in English.	
s		
t		
v		
w		
x	.. .. .	Sawákin.
y	is always a consonant, as in <i>yard</i> , and therefore should never be used as a terminal, <i>i</i> or <i>e</i> being substituted. Thus, not <i>Mikindány</i> , but not <i>Kwaly</i> , but	Kikúyu.
z	English <i>z</i>	Mikindáni.
	Accents should not generally be used, but where there is a very decided emphatic syllable or stress, which affects the sound of the word, it should be marked by an acute accent.	Kwale.
		Zulu.
		Tongatábu, Galápagos, Paláwan, Saráwak.

GEOGRAPHICAL NOTES.

Vote of Congratulation to the King of the Belgians.—The Council of the Royal Geographical Society at their meeting of June 22nd, unanimously passed a Vote of Congratulation to the King of the Belgians on the success which has attended his work of exploration and civilisation in Tropical Africa. The resolution was as follows:—"That the thanks of the Council be conveyed to King Leopold II., the King of the Belgians, for the interest taken by his Majesty in the exploration of Africa, and respectful congratulations on the signal success which has attended the schemes promoted by his Majesty's wisdom and munificence." The Marquis of Lorne, on communicating this vote to his Majesty, received the following reply:—"Pavillon d'Ostende, le 6 Juillet, 1885. Mon cher cousin,—J'ai été très heureux de recevoir la délibération du Conseil de la Société Royale de Géographie de Londres dont vous avez eu la bonté de me faire part en votre qualité de Président. Je suis extrêmement sensible à la démarche si flatteuse pour moi du Conseil de la Société et j'ai chargé le ministre de Belgique de lui faire parvenir mes remerciements officiels. Ne doutant pas de la grande part que vous avez prise à la délibération du Conseil, je vous prie de recevoir l'expression de ma reconnaissance et de vouloir bien dire à vos collègues le prix que j'attache à leur approbation. Les principaux membres de la Société R. de Géographie de Londres ont puissamment contribué au succès du Congrès de Géographie de Bruxelles et à la rédaction du programme qui a été suivi depuis par les Associations Africaines fondées à la suite de cette réunion. La bienveillance avec laquelle les membres de la Société Royale de Géographie de Londres saluent les débuts du nouvel Etat Indépendant du Congo me fait espérer qu'il pourra toujours compter sur leur sympathie. Pour que l'Etat Indépendant du Congo rende à la civilisation et au commerce les services que nous en attendons, il importe que nous le dotions d'un chemin de fer entre Vivi et le Stanley Pool, et que nous mettions à la tête de l'Etat en Afrique des agents capables. Nous nous occupons activement de ce chemin de fer, des études sur le terrain sont maintenant en cours, nous ne voulons lancer notre projet que lorsqu'elles seront terminées et que nous serons d'accord avec des maisons de tout premier ordre. . . Je suis, &c., LÉOPOLD."—The above-mentioned official letter from the Belgian Minister, Baron Solvyns, was as follows:—"Belgian Legation, July 7th, 1885. My Lord,—I am instructed by the King of the Belgians to forward the enclosed private letter to your Lordship, and, at the same time, to convey officially his Majesty's grateful acknowledgment of the resolution which was passed by the Council of the London Geographical Society, and which accompanied your letter of the 29th ultimo. His Majesty hopes that your Lordship will kindly express to the Members of the Society the great satisfaction which he

feels in knowing that his untiring efforts to introduce civilisation into the heart of Africa are appreciated by such high and competent authority. I have the honour to be, &c., SOLVYNS.—To the most noble the Marquess of Lorne, K.T., President of the Royal Geographical Society."

The Congo; Mr. Grenfell's Journey up the Mobangi Tributary.—In the July No. of the 'Proceedings' (*ante*, p. 455) we published a brief general account received from the Rev. G. Grenfell of his recent visit to the Stanley Falls of the Upper Congo, and his ascent of numerous tributaries in the course of the voyage. We have since received from him an excellent chart of the largest of these tributaries, the Mobangi, the mouth of which only is barely indicated on Mr. Stanley's latest map, but which proves to be a great navigable stream, flowing nearly from north to south across the great blank on our present maps of Africa which extends between the sources of the Benue and Shari to the Congo. Mr. Grenfell navigated this river in the missionary steamer *Peace* through five degrees of latitude, from its junction with the Congo, in a delta extending from 26 to 42 minutes south of the Equator, to $4^{\circ} 27'$ N. latitude. Throughout the whole distance he found it a magnificent stream, nowhere less than 673 yards wide, and with a mean depth of 25 feet. At the furthest point reached he found it still an open waterway. It is full of islands, and its banks are more densely populated than any part of the course of the Congo of equal extent; the country everywhere was richly wooded and appeared to be of great fertility. By some unexplained accident three sheets out of the ten of which the chart consists were found to be missing, when received by Mr. Bowser, the correspondent in England to whom Mr. Grenfell addressed it by post from Stanley Pool; its publication therefore must be deferred until a fresh copy of the missing sheets arrives.

Longitude of Blantyre.—In our July number we gave a summary of the number and class of observations taken by Mr. H. E. O'Neill, between the Mozambique coast and Lake Nyassa. The results of these observations are shown, in the positions assigned to the places where the observations were taken, on the map of "East Africa between the Zambesi and Rovuma rivers," published in the same number of our 'Proceedings.' Special attention, however, may be directed to the position, in longitude, which has been definitely assigned to Blantyre, and its acceptance by the Council of the Royal Geographical Society as a secondary meridian. This most important step has been made possible, owing to the number and excellence of Mr. O'Neill's lunar observations, taken specially for the determination of the longitude of this important station, with the greatest amount of accuracy of which such a class of observation is capable. After careful computation, and making choice of such observations as from their nature were best calculated to eliminate possible errors of observation, the longitude of Blantyre has been fixed at $35^{\circ} 3' 54''$ East

of Greenwich, thus differing 7' 24" from the previously accepted position, which was 34° 56' 30" E.

African "States."—In an article in the July part of 'Petermann's Mitteilungen,' Professor Ratzel seeks to show how misleading it is to colour the map of Africa with definite political boundaries. In Europe we find the type of civilisation pretty nearly the same all over. In Africa the state of culture of the population is as varied as its ethnology. The prime element in the so-called political geography of Africa is not the countries, but the people; not the kingdoms, but the various stages of culture. Professor Ratzel makes some thoughtful remarks on the elements of "Anthropogeography" generally, and in accordance with his conception divides Africa into twelve "State-forming" peoples, under the two great sections of North African and Sudan States, and Negro States. Professor Ratzel's remarks accompany two maps, one being a sketch of a "culture-map" of Africa, and the other exhibiting the "State-forming" peoples and native States.

Dr. Hannington, Bishop of Equatorial Africa, started with Mr. Taylor early in June to explore a route, different from that followed by Mr. Joseph Thomson, via Chagga and the Masai country to the eastern shores of Victoria Nyanza. He is of opinion that, if this route be once opened, all the caravans for Mombasa to the interior would adopt it, and there would be great saving of time and distance. The Bishop has attached himself to a Swahili caravan. He hopes to touch Lake Naivasha and emerge at Sendega in Lower Kavirondo. We hope to hear of the safe arrival of the adventurous missionaries, who, if they succeed, will have accomplished a work of great geographical as well as humanitarian value. It appears that Sir John Kirk was consulted, and approved of the scheme. The Bishop has already been to the south-east corner of the lake by the usual route from Zanzibar, and is not a novice in African travel.

A Swedish Settlement on the West Coast of Africa.—According to advices received in Sweden from the West Coast of Africa, some Swedish merchants have purchased in the Massanja country, in the Cameroons, some 20 square miles of land, on which the Swedish flag was hoisted with proper honours some months ago. The climate is stated to be good, and the soil rich; cacao, coffee, sugar, rice, and indigo being cultivated. The settlers have succeeded in establishing considerable trade with the natives, chiefly in indiarubber, produced in large quantities in the adjacent forests. They further state that had they been so empowered by the Swedish Government on landing there two years ago they could have taken possession of the country from Boto, near Victoria, to Rio del Rey, one of the richest tracts of land on the West Coast of Africa. At present they trade at their own risk.

The Copper-mines of Katanga.—The German East African Expedition, which was despatched about five years ago, has now been brought to a close, and its only survivor, Herr Paul Reichard, has probably by this time reached Zanzibar. The scientific results may not quite come up to expectations, especially if we consider the heavy cost incurred, but they are nevertheless of great importance. The astronomical observations and route surveys made by Dr. Kaiser have furnished excellent materials for a map, whilst the scientific collections made by Dr. Böhm have enlarged our knowledge of the natural history and anthropology of Africa. As far as the exploration of positively new ground is concerned the terminal stage of the expedition has proved by far the most successful, for Dr. Böhm and Herr Reichard, who left the Belgian Station, Mpala, on the Tanganyika, on September 1st, 1883, have succeeded in crossing the Luapula into Urua, and Herr Reichard, after Dr. Böhm's death, which took place on March 27th, ascended the Lufira river as far as the famous copper-mines at Katanga. We gather from a preliminary report published in the 'Mittheilungen' of the German African Association, that the wide region lying between the Lualaba, Urua, the Konde Irunde mountains, and Iramba, is governed by a powerful chief called Msirri. The Lualaba, which bounds his dominions on the west, is described as a considerable river, between four and six hundred yards wide where Herr Reichard saw it, and said to be navigable as far as Manyema. This river, as far as volume goes, must be looked upon as the real head of the Congo. It flows through the Upemba lake (the Luhemba of the Society's map), and further north through Cameron's Kikonja lake. The Lufira, which is tributary to it, flows through the centre of the country. It rises ten days' journey to the south of Katanga, is 40 to 70 yards wide where Herr Reichard crossed it, and forms several waterfalls. Katanga lies about 250 miles to the south-west of the Luapula, and forms part of Msirri's dominions. Herr Reichard visited two of its copper-mines. They are exceedingly rich, but are not being worked at present. A considerable trade is carried on with the west coast, the principal articles of export being ivory, rubber, wax, and young slaves. The Luapula, which Herr Reichard crossed twice, is only about 200 yards in width, and forms numerous waterfalls and rapids during its passage through the Konde Irunde and the Mitumba mountains. These explorations, jointly with what Lieut. Giraud has recently done around Lake Bangweolo, considerably affect the map of an interesting portion of Central Africa, and we therefore propose to return to the subject in the next number of the 'Proceedings.'

Recent Events on the Upper Zambesi.—The latest news from the Upper Zambesi is dated December 22nd, 1884. MM. Coillard (accompanied by his wife and niece) and Jeanmairet of the Protestant Evangelical Mission of Paris, had penetrated to Shesheke, and found great

political changes had occurred since M. Coillard's last visit six years before. Robosi, the king of the Ba-Rotshi (Barotse) resided at Lialui, higher up the Zambesi, but while the French missionaries were at Shesheke, a revolution broke out, and the king had to fly for his life. A new king named Maina, otherwise Akufuna, was elected; when securely installed on his throne, he sent messengers to M. Coillard to come to him, and our last news is from him on his road with only native followers to Lialui.—The Roman Catholic missionaries had not been able to get beyond the Zambesi.

Missing African Explorers.—We are glad to learn that the explorers Dr. Junker and M. Casati, about whose fate there was much concern, are safe at Lado, on the Upper Nile.

The Expedition to Gilghit.—The Indian mission to Gilghit has mainly political objects in view, but it is also intended that full surveys of the region lying to the north-west of Kashmir should be executed. The party consists of Colonel Lockhart, whose services in connection with the negotiations for the release of the *Nisero* crew will be fresh in the memory of our readers, Colonel Woodthorpe, R.E., of the Survey Department, who has recently returned from the eastern frontier of India, where he has been examining the trade route from Assam to Burmah by the hills to the north-east of Manipur, Captain E. Barrow of the Intelligence Branch, and Dr. G. M. J. Giles, who undertakes the work of geologist and naturalist. An escort of twenty sepoy will accompany the party. A political post of observation is much needed in this remote angle of British territory, as there are several passes of no great difficulty leading towards the Russian possessions, which here approach our frontier very closely. Major Biddulph and Colonel Tanner have both done important exploring work round about Gilghit of late years, and Colonel Woodthorpe will have an opportunity of completing their gaps and possibly of extending his surveys into Kafiristan, Hunza-Nagyr, and across the Hindu Kush. Colonel Lockhart's party left Srinagar on the 26th of June, but according to recent intelligence their progress has been delayed by a fall of snow in the Kamri Pass.

Colonel Woodthorpe in the Singpho Country.—Colonel Woodthorpe's travels on the Eastern Frontier commenced at Sadiya, whence he started in January last, taking a south-east course along the Dehing. Having passed through two large and well-known Singpho villages, Bhusa and Kumki, the party crossed the snowy range forming the water-parting of the Dehing and Irawadi by a pass about 8000 feet high. The country was very difficult, and almost uninhabited. With a reduced escort Colonel Woodthorpe descended into the country of the Bor Khamptis on the northern Irawadi, where no traveller is believed to have penetrated since Lieutenant Wilcox's tour in 1828. The country is said to be well

cultivated, and opium is largely grown. Silver mines lie to the north-east of Pedan, the capital, and are worked by an inferior and half-subject race called Khanungs. Pedan was visited by the survey party, and its people proved most friendly and brought most acceptable gifts of provisions, but Colonel Woodthorpe had to hurry back to avoid being cut off by the rising of the river. It would appear, however, that there is an easier route to the south, striking the Irawadi at Mung Lung, about 100 miles south of Pedan, where the river is navigable (it was found unnavigable at Pedan), and that this route has the further advantage of crossing the water-parting by a pass only 4000 feet in height. Full conclusions on the value of Colonel Woodthorpe's researches must however be deferred till the appearance of the Report, which is understood to be nearly completed.

Dr. Otto Finsch's Expedition.—A telegram from Cooktown announces the arrival there of the New Guinea Company's steamer *Samoa* with Dr. Finsch on board, who is returning to Europe from his recent exploring expedition along the unknown portions of the coast of Kaiser Wilhelmsland which are situated between Astrolabe Bay and Humboldt Bay. Dr. Finsch reports the discovery of several good harbours and of a navigable river. The land is suitable both for agriculture and stock-raising. The natives were friendly.

Arctic.—Four Arctic expeditions are said to be projected for next year, two organised in Portugal, one in Holland, and one in Denmark. They all propose to visit the islands of the glacial ocean which belong to Russia, but the Danish expedition will specially explore the Kara Sea and the northern coast of Siberia, to define, if possible, the unknown region which is supposed to lie to the north-east of Novaya Zemlya.

The Ice on the Greenland Coast.—The captains of several Norwegian steamers despatched to Greenland for seal-hunting, report that in consequence of the enormous ice-masses on the east and south coasts no seals have been killed by any vessel. The state of the ice this summer seems to be just the reverse of that of last year, when the coast was unusually free from ice.

The Hudson Bay Expedition.—We regret to learn that the *Alert*, which set out, in May last, on its second expedition to Hudson's Bay, has sustained considerable damage, and recently returned to St. John's, Newfoundland, for repairs.

Changes of Level in the Scandinavian Peninsula.—At the meeting of the Paris Geographical Society on July 3rd, M. Jules Girard gave some useful figures as to the changes of level on the coasts of the Scandinavian Peninsula in recent years. A series of thirty bench-marks was made in 1851 on the coast of the Baltic, from Tornea to the Naze, in continuation of the memorable work of Celsius, and in 1884 these were

critically examined by a Commission of the Swedish Academy of Sciences. It was established that the movement of elevation was continued in the north, and of depression at the south extremity of the Peninsula. About Calmar and Carlsrona, as on previous examinations, no change of level could be detected. The results compared with previous observations, that is for a period of 134 years, prove that since 1750, the head of the Gulf of Bothnia has risen 2·10 metres, or 1·170 metre per century. This rate of elevation declines progressively towards the south. It is not more than 0·30 metre at the Naze, and it is zero at Bornholm. The mean elevation of the Swedish coast is thus 1·60 metre per century.

Altitudes in the United States.—Bulletin No. 5 of the United States Geological Survey consists of a dictionary of altitudes in the United States, by Mr. Henry Gannett, the chief geographer. The lists of altitude are arranged alphabetically according to States, and the volume extends to 325 pages. Previous editions of this useful list related principally to that portion of the country west of the Mississippi river, while the present edition embraces within its scope the whole country.

International Colonial Review.—The first number of this new journal has been issued under the editorship of Drs. C. M. Kan, Van der Lith, and Jitta. The first article is by Sir Richard Temple, who discusses the question of Imperial Federation. Dr. Fried. Fabri contributes a paper, in German, on German Colonial Policy, and Professor Levasseur a paper, in French, on the Productive Forces of British Australasia. Commander Lovett Cameron reviews Mr. Stanley's recently published work on the Congo. One of the most useful sections of the review is the Quarterly Bibliographical Chronicle by Professor Kan, which occupies 13 pages. There is also a monthly bibliography by Dr. H. C. Rogge. The remainder of the review (which covers 96 pages) is occupied with various notes and notices. The London agents are Trübner and Co.

The Exhibition of Geographical Appliances.—The exhibition of the various objects collected by Mr. Keltie during his tour of inspection in England and on the Continent, will probably be opened about the 16th of November; but due notice will be given as to the precise date and place. The principal geographical publishers, both of this country and of the leading countries on the Continent, have contributed to the exhibition. It has not been sought to make the collection exhaustive of all appliances used in geographical education; but rather to obtain specimens representative of the various classes of objects used in schools at home and abroad. These objects include text-books for pupils, and handbooks for teachers; wall-maps, of which a very considerable number has been obtained; atlases and small maps for pupils; reliefs large and small, including relief maps; geographical wall-pictures by various publishers; globes, plain and relief; telluria;

specimens of work done by pupils, &c., &c. A classified catalogue of the exhibits will be prepared by Mr. Keltie, who hopes to include in it remarks on the various classes of objects. The exhibition will remain open during the months of November, December, and January, a period which, it is hoped, will prove convenient to those for whose special benefit it has been organised. If any of our readers possess objects which they think might appropriately find a place in the exhibition, they might be good enough to communicate with Mr. Keltie.

CORRESPONDENCE.

Gold-washing in Tibet.

SHANGHAI, 2nd May, 1885.

SIR,—In the March number of the Society's 'Proceedings,' at page 172, I note that Colonel Prejevalsky says, "Gold is very plentiful throughout Northern Tibet. At the diggings we visited the Tungutans went no deeper than one or two feet from the surface, and the washing was of the most primitive description. Nevertheless they showed us whole handfuls of gold, in lumps as big as peas, and twice and thrice as big. Without doubt with more careful washings vast treasures would be found here."

I am afraid that Prejevalsky is mistaken, but his mistake can be easily explained, and, geologists will understand what I mean, appearances have deceived him. Gold being of greater specific gravity than the pebbles and gravel under which it is found, readily sinks through the strata, until arrested by the solid rock formation first met with. The diggers seen by the enterprising colonel were probably washing out the old bed of a lake or river, and at a place where the rock was covered by a couple of feet of the movable *strata* only, because it gave less trouble to reach the solid rock or bed on which the gold invariably lies, and which, in my opinion, is the only place to find gold, excepting of course in an amalgamated state, with other metals, or quartz, &c. Gold may of course be found beneath the same kind of pebble beds at greater depths, but always I believe resting on a solid sole-plate of rock. I have myself visited the gold-fields of Northern and Eastern Tibet, and those of Hu-nan also, and found the same conditions prevailed, at each place.

In the Koko-nor region, I saw men digging down under a pebble bed over twenty feet thick, but they did not wash the upper stuff, they only commenced to wash when within a couple of feet of the rocky sole, on which the gold was found in nuggets, varying from the size of a turnip seed to a pea, and I was told that lumps of several taels weight were occasionally unearthed. On the other hand I have seen nuggets of gold in Eastern Tibet varying from the size of a pea to that of a hazel-nut, and as in the first case the gold was almost pure, and perfectly malleable.

I also found traces of platinum in the Koko-nor region, but the diggers did not prize it enough to collect it even, as they were unable to melt it.

In the winter of 1880-1881, I wrote an account of my journey in that region which I sent to the late Captain W. Gill for the Royal Geographical Society, but I

do not now remember all I then wrote, and I have lost the copy of the letter, and my notes also.

Trusting that the above will tend to explain the erroneous idea that, because gold is found at a couple of feet below the surface, it must necessarily be very plentiful at greater depths, when in reality that can hardly be the case, if the rock is reached beneath a couple of feet of pebbles.

W. MESNY.

To the President of the R.G.S.

Obituary.

Dr. Emil Riebeck, a Fellow of our Society, died on June 22nd, 1885, in the thirty-second year of his age, at Feldkirch, when about to return from Switzerland to his native town, Halle-on-the-Saale. By the death of his father a few years ago the deceased came into possession of a considerable fortune, and he determined to employ some of his ample means in the furtherance of anthropological and geographical research. In the summer of 1880 he left Germany for the East, accompanied by Dr. F. Mook and C. B. Rosset. Having visited the Caucasus, Greece, Asia Minor, and parts of Syria, Dr. Riebeck attempted an exploration of Moab, which was frustrated by the Meshali Arabs. On the return from Kerak, Dr. Mook was drowned in the Jordan. His place was subsequently filled by Dr. Mantei. In Egypt Dr. Schweinfurth joined the expedition, and under his leadership a visit was paid to the island of Sokotra, which was fruitful in scientific results. Subsequently Dr. Riebeck visited India and Eastern Asia as far as China and Japan. The results of one of the most interesting incidents of these explorations have only recently been published by Dr. Riebeck in a handsomely illustrated folio volume entitled "The Chittagong Hill Tribes: results of a journey made in the year 1882." In 1883 Dr. Riebeck returned to Germany. His collections were exhibited in the Berlin Industrial Museum, where they deservedly attracted much attention.

In 1884 Herr G. A. Krause, who had done some good linguistic work in Northern Africa, applied to Dr. Riebeck for the means which would enable him to sojourn for some time in the Niger region. Dr. Riebeck at once acceded to his request. This Niger Expedition, however, notwithstanding that it involved its promoter in an expenditure of 1500*l.*, yielded hardly any results. At the time of his death Dr. Riebeck had planned a great expedition round the world, which would have taken him more especially to the minor islands of the Pacific. Dr. C. von den Steinen, only recently returned from a successful exploratory journey in South America, and Dr. C. Dettenborn were to have been his companions. In August Dr. Riebeck intended to have come to London to make his final preparation for this expedition, had not death prematurely cut short his career. In Dr. Riebeck the cause of geographical research has lost a liberal supporter.

REPORT OF THE EVENING MEETINGS, SESSION 1884-5.

Fourteenth Meeting, 22nd June, 1885.—The Most Hon. the
Marquis of LORNE, K.T., President, in the Chair.

ELECTIONS.—*Campbell Farquhar, Esq.; William E. Downey, Esq.; John Foreman, Esq.; Albert George Sidney Hawes, Esq.* (H.M. Consul, Nyassa); *A. Staveley Hill, Esq., M.P.; John Coulson Kernahan, Esq.; John Henry Leech, Esq.; Alexander Macdonald, Esq.; George Henry Perkins, Esq.; John Josiah Pledge, Esq.; Cormell Price, Esq., M.A.; John Rudd Rainey, Esq.; E. M. R. G. Emmott Rawdon, Esq.; William James Lyon Roe, Esq.; John W. Rowland, Esq.; George Whitaker, Esq.*

The following paper was read :—

“On the Countries and Tribes bordering on the Koh-i-Baba Range.” By Lieut-General Sir Peter S. Lumsden, K.C.B.

Will be published, with discussion and map, in the September number of the ‘Proceedings.’

Fifteenth (extra) Meeting, 29th June, 1885.—The Most Hon. the
Marquis of LORNE, K.T., President, in the Chair.

ELECTIONS.—*Dr. Carl Dettenborn; Hugh Eccles, Esq.; Leonard Frederick Harrold, Esq.; F. W. E. H. Johnson, Esq.; Charles Thomas Maude, Esq.; John Samson, Esq.; Dr. Carl von den Steinen.*

The following paper was read :—

“A Journey through the Somali Country to the Webbe Shebeyli.” By F. L. James, Esq.

Will be published, with the author’s map, in a subsequent number of the ‘Proceedings.’

PROCEEDINGS OF FOREIGN SOCIETIES.

Geographical Society of Paris.—First General Meeting of the present year, held on 24th April, 1885: M. FERDINAND DE LESSEPS, of the Institute, in the Chair.—The Chairman in his opening speech touched upon several of the burning questions of the day, his remarks being characterised by extreme delicacy and discretion. His justification for alluding (contrary to his usual practice) to these subjects was, he said, the fact that the increasing development of railway and telegraphic communication made us more sensible to the political vibrations of distant lands, and rendered it less possible for us to be disinterested, under the pretext of distance, in countries which our maps only thirty years ago represented by undefined lines and doubtful names. From a perusal of the history of recent events in the Soudan, in Madagascar, Afghanistan, Tonking, and Formosa, it would be seen to what a large extent generals had often been embarrassed in consequence of want of accurate information respecting the field of their operations. “We ought therefore,” he added, “to urge here once more the extreme importance, the rigorous necessity of geographical explorations.” No dissimulation, said M. de Lesseps in the course of his remarks with reference to Afghanistan, could conceal the fact that the present political equilibrium contained germs of instability, and that diplomatists

and soldiers alike were perplexed as to the course to be adopted. "The English," said he, "are alarmed at the continued advance of Russia to the borders of India. It is possible to foresee the day when the Russians, who have already a common frontier with China of nearly 5000 miles (8000 kilometres), will be found on the confines of India. Let us hope that this inevitable result may be arrived at without a sanguinary struggle between two great civilised States, who will have the highest mountains in our hemisphere for their Asiatic frontier." In conclusion M. de Lesseps gave a cordial welcome to several members of the diplomatic corps who were present at the meeting, viz. the Japanese Minister, M. Hachisaka, a member of the Geographical Society of Tokio; the Swiss Minister, M. Lardy; and the Chief Secretary of the Danish Embassy, who represented Count Moltke-Hivfeldt, the Danish Minister.—M. W. Huber then read the general report of the various explorations and geographical works to which the Commission of Prizes had awarded the medals and prizes of the Society for the year 1885. The gold medals had been given, first, to Vicomte Charles de Foucauld for his journey in the south of Morocco and the western part of the Atlas range; second, to M. Victor Giraud for his travels in the region of the great lakes of Equatorial Africa; third, to M. Paul Neis, Naval Physician, for his explorations in Indo-China (Laos and the basin of the Donnaï as far as the source of the latter). The "Roquette" Prize had been awarded to a Danish publication entitled '*Meddelelser om Grønland*,' which contained in a condensed form all the results obtained in that country by the members of a Commission of Exploration appointed by the Government of Copenhagen. The "Jomard" Prize had been given to a large work in six volumes published by Leroux under the direction of MM. Schefer (of the Institute), Henri Cordier, and Harrisæ. The name of the work was '*Recueil de voyages et de documents pour servir à l'histoire de la géographie depuis le XIII^e siècle jusqu'à la fin du XVI^e*.' Lastly the "Erhard" Prize had been awarded to a clever and modest cartographer, M. Dumas-Vorzet (a fellow-worker with Vivien de St. Martin on the Universal Atlas) who however had not been able to receive his honour, having died a few days ago; it was stated that he had succumbed to excess of work. In concluding his report the Secretary announced that two new prizes would shortly be added to those which the Society was now in a position to award. The two prizes were those of M. J. B. Morot, who had bequeathed a sum of 80*l.* (2000 francs), the interest of which was to be given annually to the French navigator or traveller who should in the course of the year have approached nearest to the North Pole, and that of M. Felix Fournier, who had left to the Society the sum of 2000*l.* (50,000 francs) to found an annual prize "with the object of rewarding the best geographical work (either maps or books) published during the year." MM. Huber, Dutreuil de Rhins, Schrader, and Dr. Hamy then read their several reports on the explorations and works which had merited the medals and prizes referred to above. It is not necessary to speak here of M. Victor Giraud's journey, as a full report of the account given by the traveller himself at a recent and important meeting at Sorbonne has already been published in the R. G. S. '*Proceedings*' for May. With regard to M. Charles de Foucauld's journey it was stated that his object was to gain information for France as to what was transpiring in the vicinity of her Algerian possessions, and he had accomplished from 1883 to 1884 a journey of exploration in Morocco. For this purpose, having renounced his future prospects in the military career, he had disguised himself in the costume of a Jew, in spite of the antipathy of the natives to persons of that religion. However, this particular disguise enabled him to conceal his barometer and sextant under the long veil with which the Jew covers himself during prayer. Deprived of all comforts, without servants, without an animal upon which to ride, without tent and bed, and almost without baggage, he had travelled and worked during eleven months

among these people who had more than once before unmasked similar attempts and inflicted upon the unfortunate individual the punishment which the crime appeared to them to deserve, viz. death. At the time when M. de Foucauld commenced his journey our knowledge of the geography of Morocco was very limited. In 1845 an able and conscientious geographer, M. Emilien Renou, prepared the first map of Morocco on the scale 1:2,000,000, the value of which was recognised even to-day. Three years after this publication, Captain Baudouin, with the aid of additional information, revised this work for the War Department, increasing the scale to 1:1,500,000. All subsequent maps had been prepared on the basis of these two just mentioned. To the 7600 miles (12,200 kilometres) of roads marked out with but few determinations of latitude and still fewer points of longitude, which cartographers had at their disposal in 1883, M. de Foucauld had added 1400 miles (2250 kilometres) of new ground besides revising and perfecting in the course of his journey the work of his predecessors. His travels occupied him from 20th June, 1883 to 23rd May, 1884. The orography and hydrography of Morocco had been the special objects to which the young traveller had directed his studies and explorations. From Cape Guir, or Ghir on our maps, to the Algerian frontier the length of the great Atlas range was, as was well known, 435 miles (700 kilometres). But along this extensive chain of mountains only four points had been determined by the itineraries of all European travellers who had crossed the range in these four places only. M. de Foucauld had traversed the chain at several new points, of which he had determined the altitude, besides having journeyed for 185 miles (300 kilometres) along the base of the range, rectifying and simplifying by fresh information the orography of the country. Thanks to him we now know, said M. Henri Duveyrier, the author of the report, that from 31 miles (50 kilometres) in the north and 103 miles (175 kilometres) in the south this commanding range was flanked by parallel lines of elevation, which, as far as our maps were concerned, was quite a revelation. It may be stated here that M. Duveyrier was unable to read this report himself, as he is now travelling in this very country of Morocco. We learn from M. de Foucauld that there is in the north a chain of mountains about 185 miles (300 kilometres) in length, which bears the names of Djebel-Ait-Seri and Djebel-Beni-Uaghaïn. In the south there is first of all the Little Atlas (the Anti-Atlas on the map of Lenz), and still further south the strange outline of the Djebel-Bani range, the name of which we know from the Rabbi Mardochée, and which Lenz crossed but without identifying it. This journey extending over five degrees to the south of Meknâs, was accomplished by M. de Foucauld in the midst of warlike peoples and marauding tribes. In the month of December 1883 the traveller touched the Uâdi Dhrâ'a to the south of Tattas. "This river," says he, "the bed of which is nearly 2½ miles (4 kilometres) in breadth, is absolutely dry, except during the melting of the snow and the seasons of continuous rain." Later on he again saw the river further to the north-east, in the district of Mezquita, "where this same river, broad and with uninterrupted stream, flows through plantations of date-palms." The itinerary of M. de Foucauld places that part of the course of the Uâdi Dhrâ'a as indicated on Dr. Rohlf's map quite one degree further west; this important correction should be utilised to revise the itinerary of the German traveller. Finally the accurate information obtained by M. de Foucauld literally revolutionises our previous geographical and political knowledge of Morocco. The report concluded by affirming that the highest distinction which the Society could confer would not more than recompense such a work as that done by M. de Foucauld. The Society, however, had been compelled this year to take into account the merits of other competitors, especially of M. Giraud. M. Dutreuil du Rhins, formerly in the service of the Annamite navy, and author of a map of Indo-China, then read an account of the travels of Dr. Neis, a physician in

the Navy. The results of these journeys are as follows. Few travellers, said M. de Rhins, had been more constantly thwarted than had Dr. Neis during his long journey of more than 3000 miles (5000 kilometres), but it could easily be seen from the report he had read what science would have gained had the traveller been allowed greater freedom of action, been more fully equipped, and possessed better directions. From a geographical point of view the itineraries of the Doctor, based as they were upon observations of latitude and completed by determinations of altitudes, formed a work of the most interesting kind upon a part of Central Laos. He had collected a large amount of information as to the several commercial routes of the western basin of the Mekong river. Moreover it would be possible, from the indications which he had been able to give as to the Tram Nigne and the Nam-hu, to trace approximately a new route between Luang-Prabang and the northern part of the Annamite province of Tagne-hoa. The traveller's meteorological journal, which had been regularly kept by him from the time he entered Laos to the date of his return to Bangkok, would be valuable to meteorologists not less than to geographers, who would be able to deduce from it the altitudes of the entire route traversed. Among his collections would be found a hundred specimens of rocks collected between Cambodia and Luang-Prabang, a large number of insects, serpents, and fish; skulls and skeletons of the Khâs, samples of the products of Laos, including cotton, silk, benzoin, &c. His notes would enrich our vocabulary of the Indo-Chinese idioms, and his extensive works on the anthropology and ethnography of Laos and the Khâs would complete the study he had made of the Moïs of Donnaï. Finally, said M. du Rhins, Dr. Neis had come back with a vast fund of information on the regions visited by him, on their resources, and on their social, commercial, and political condition. —In conclusion, Dr. Ballay, the colleague of M. de Brazza, read a paper on the Ogowé and the Congo rivers. A map, which was handed round among the audience, enabled those present to follow the account of the traveller. He commenced by relating the events of his stay in Gabon, and the long delays to which he was compelled to submit before being able to transport his two canoes (these being made to take to pieces) to their destination on the Alima. At last he was able to ascend the Ogowé with a flotilla of twenty-eight canoes, but the advance of the dry season rendered navigation extremely difficult and perilous. M. Ballay then gave a rapid description of the river, and related how he had been able to transport the component parts of one of his canoes from Franceville on the Upper Ogowé to the Alima, a distance of over 90 miles (150 kilometres), through the country of the Batekes. He then entered into some details as to the manners and customs of this people; along his route he said he had met with a large number of human remains, which proved that even the natives themselves could not venture with impunity into this district of arid steppes, where there were neither water nor resources of any kind. On the Upper Alima Dr. Ballay encountered the Apfurus. Formerly (1878) M. de Brazza and his companion had been at war with this tribe, but on the present occasion the traveller concluded a peace with them, and thus secured the French protectorate on the Alima. He then proceeded to explore the river with the aid of canoes supplied to him by the Apfurus, establishing everywhere permanent influence in the interests of France. Upon arrival on the Congo the traveller met with an enthusiastic reception from King Makoko. Having alluded briefly to the political results obtained by M. de Brazza's mission, Dr. Ballay indicated the limits of the new French colony as determined by the action of the Conference of Berlin [and the treaties concluded with the International African Association and Portugal. Speaking of this new colony, he said that the natives inhabiting the basin of the Congo were much more intelligent than those of Gabon, that it was to agriculture especially that the energies of the future must be devoted, with the negroes as

labourers, as white men were unsuited for labour in that climate. Wisely putting his hearers on their guard against the colonial fever, he pointed out that the object to be pursued was the commercial and pacific conquest of the country, an aim which could be secured with comparatively small expense.—Before the meeting rose the Chairman announced the results of the ballot for the reconstitution of the Bureau of the Society. The following had been elected:—President, M. Ferdinand de Lesseps, of the Institute (re-elected); Vice-Presidents, M. Himly, Dean of the Faculty of Letters and member of the Institute, and M. Bischoffsheim, member of the Chamber of Deputies.

—May 8th, 1885: M. ALPH. MILNE-EDWARDS, of the Institute, in the Chair.—The Chairman opened the meeting with the announcement that another bequest had been made to the Society. One of its members, M. Pichard, late public notary, who died at the end of last month, had left to the Society the sum of 200*l*. (5000 francs) free of all expense and duty. The Chairman then announced the return and presence at the meeting of M. Alfred Marche, who had come back from a three years' journey to the Philippine Islands. There were present also at the meeting M. Velin, who had just completed a journey across Siberia, and M. de Hirschenfeld, fellow traveller with M. Rogozinski to the Cameroons. M. de Hirschenfeld had further made a journey to the sources of the Niger, and was making preparations for an early return to Africa.—M. Gouin, lieutenant of the Navy and French Resident at Nam-Dinh (Tongking) forwarded a communication specially occupied with a description of the coast and the mouths of the rivers from the frontier of China to that of Annam. Accompanying his paper was a map of the mouths of the Day river. He also sent an account of the Annamite fêtes, giving some curious details of these celebrations and specially of the rigorous manner in which the fête of the Têt, or the first day of the Annamite year, was observed.—Another officer of the Navy, M. Baudens, wrote informing the Society that he had made a hydrographical survey of the Red river, but only from the river Claire to Honghoa, the alluvial deposits having modified the old map and the entrance of the Black river. The expedition to the Upper Red river, which was about to start at the time he wrote, would give him the opportunity of carefully revising the map of this portion of the river.—The Minister of Public Instruction forwarded a report by M. Leon Guiral, now engaged on a scientific mission on the west coast of Africa, containing a description of this coast from the San Benito or Eyo as far as the river Dote, which flows about 7½ miles (12 kilometres) to the south of the former river. Eyo is the native name of the river. San Benito or Benito would seem, according to the natives, to have been the name given to the river by slave-dealers, probably Portuguese. At its mouth the Eyo is one mile in breadth. Banks of rocks visible at low water form a barrier at the entrance, and consequently the left arm only of the river is navigable for vessels drawing more than 6½ feet (2 metres) of water. The banks of the river are marshy. M. Guiral has, it seems, ascended it for a distance of 21 miles (30 to 35 kilometres) as far as Sniger, where he found falls. The traveller mentions the following tributaries:—the Poto and the Guge, which he was told were navigable in a canoe, the Oca, the Otonge, the Ugabe or Ngabi (we cannot guarantee the orthography of all these names), and the Magne; he also gives the names of some islands, viz. Muanjulena, Matanda, Manjanga, Dongue. Being constantly engaged on the river, M. Guiral is not able to furnish much precise information about the inhabitants of the basin of the Eyo; he noticed, however, among them an inordinate passion for brandy, and was struck with the ravages which this spirit has made among the population. The Dote is a river of little importance. The traveller ascended it in a canoe for a distance of eight miles from the coast. Its banks are marshy. The depth of the river is about 3½ feet (1 metre),

and its breadth at the mouth and along the accessible part of its course is 130 feet (40 metres). It can be ascended in a canoe for a two days' journey, or for about 21 miles (30 to 35 kilometres). The village from which it takes its name is situated on the right bank. The commerce of the district concentrates there, but is of little importance, consisting only of red wood, ebony, and indiarubber. In order, however, to convey these products to the coast the inhabitants are obliged to wait for the rainy season. The natives are men of tall stature, energetic, navigating their canoes with courage, but are given up to brandy-drinking. The commerce of the valley of the Eyo is not much more considerable, being confined to indiarubber, palm-oil, and wood, products which are brought down by the tribes in the interior. M. Guiral intended to penetrate still further into the interior, first with the object of collecting natural history specimens, and afterwards of discovering the lakes and a great river of which the natives speak.—In conclusion M. J. B. Paquier, professor of geography and history, read a paper upon Herat and the route to India.

— May 22nd, 1885: M. A. GERMAIN, Vice-President of the Central Commission, in the Chair.—The Society of Historical Studies wrote informing the Society that it proposed to offer during 1886 a prize of 40*l.* (1000 francs) for competition on the subject, "A study of the consequences from an economical point of view of the piercing of the isthmus of Panama in the relations of Europe with the countries washed by the Pacific Ocean, viz.: Western America, Oceania, and Eastern Asia." The Minister of Foreign Affairs forwarded a copy of a report by the deputy of the French Consul at Zanzibar (the latter post is no longer held by M. Ch. Ledoux, one of the most regular correspondents of the Society, he having been transferred to another consular post). It was announced from the report that the fifth Belgian expedition of the International African Association had been recalled. Having arrived at Zanzibar on 30th November, 1884, it had been the intention of the mission to start for Central Africa with the view of establishing new stations between Karema and Stanley Falls, and by this means connecting the east coast with the Congo river. Captain Cambier, also the agent of the Association, was about to return to Europe. These decisions seemed to indicate that the Association was ceasing at least for a time to interest itself in the eastern coast of Africa, and that it intended to concentrate its energies in the direction of the Congo. The stations of Karema and Mpala had been handed over by the Association to the Algerian missionaries, who already possessed five establishments in the region of the Great Lakes. The death of Mirambo had been confirmed; it took place on the 2nd or 3rd of December last, and was shortly (January 1885) followed by the death of Kapira, the principal adversary of Mirambo. King Mtesa had been succeeded by his son Muango, according to information supplied by native messengers from Uganda. He was said to be intelligent and, like his father, favourable to Europeans. He had been the pupil of Father Livinhac (recently made bishop), who was going to return to Uganda to take the superintendence of the missions which should be established there in a definite manner. The "masika" or rainy season had commenced a fortnight previously, giving ground for hope that the dearth which had been desolating certain parts of the country for two years past would now come to an end. In U-doe and U-zeguha, however, seed had been so scarce that the harvest would not be very abundant this year.—A communication was received from M. Teisserenc de Bort, who is engaged on a scientific mission in Africa, stating that having started from Tuggurt he had reached the valley of the Iggharghar; then setting out from the last point visited in the S.S.W. by the Flatters Mission, he had taken a south-westerly direction to a place where the great downs commence. Passing by the wells of El Auidef, Rhurd-Rumed, &c., he had ascended towards Berecof. In the environs of Rhur-i-Rumed he had found a prehistoric station

indicated by the numerous flint arrow-heads with which the ground was covered, chips of flint, &c. From this spot to Berecof, to Nefzauna, and to Gabes(?), the presence of man at an ancient date was, he said, proved by the existence of flints cut in various shapes in nearly all the depressions where the former soil existed, that is to say nearly everywhere, the downs only occupying limited spaces. Not far from a *sebkha* or *sebkra*, of about $4\frac{1}{2}$ miles (6 to 8 kilometres) in extent, and which he discovered midway between Tuggurt and Berecof, he had found in the surrounding plains traces of fire-places indicated by collections of black stones around certain spots. These traces exist, he said, by hundreds.—M. de Quatrefages, of the Institute, revived a question which had several times been discussed at the meetings of the Society, viz. the decrease of the Indian race or of the red-skins in the United States, a decrease which some people will not recognise, alleging on the contrary that the natives are increasing. He remarked that this question was not so simple as it appeared to be at first sight, as the statistics took no account of the red-skins who mixed with the whites and disappeared among the latter. There was another important fact to which he had more than once called the attention of the Society, viz. that the cross-breeding on the one hand modified the population by transforming it, and on the other fatally vitiated the statistics. He then gave numerous examples, quoting from a work by Mr. D. Wilson, Professor at the University of Toronto (Canada), on "The civilisation and education of the Indians." In this work Mr. Wilson states "that it has now been proved that instead of being condemned to disappear in a very short space of time, the Indians in general are not decreasing in number. They are in all probability destined to constitute a permanent factor and a durable element in our population." Although the Indians had not decreased in number, they had at least lost their ethnical purity. The mixture with white blood had extended to their most remote tribes, and the number of natives of pure blood was probably quite insignificant.—M. Caspari, hydrographical engineer of the Navy, gave an account of the mission, with which he had been recently charged by the Minister of the Navy and the Colonies, to Cheik-Saïd and the Bay of Tadjura. He pointed out that at Cheik-Saïd vessels were obliged to anchor off the open coast without any shelter, and were compelled to change their place of anchorage according to the monsoon. It would, therefore, be necessary that if a station were established at this point, as recently suggested and discussed, operations should be commenced by constructing a harbour. There was no vegetation at Cheik-Saïd; water also was scarce and of but medium quality. The fauna was restricted to some gazelles and hares. The temperature during the day varied from 86° Fahr. (30° C.) in winter, to 113° Fahr. (45° C.) in summer. At Obock, the harbour without being spacious was at least safe and easily accessible. The climate was as warm as that of Aden, but more humid in winter; and, moreover, the abundance of water rendered the cultivation of vegetables possible. It was, he said, a station which would be capable of supplying provisions and coals in sufficient quantities to the vessels of the French Navy bound for the extreme East. With regard to the other stations on the Gulf of Tadjura, especially Sngallo, M. Caspari considered them only fitted for "têtes de ligne" for caravans; the nature of the soil, the unhealthy character of the climate, and the want of inclination on the part of the inhabitants for agricultural pursuits, presented serious difficulties against founding a proper colony there. The protectorate of France extended along the whole of the north coast of the gulf as far as Bahr-Assal, and the relations of France with the natives (Danakil), Mahommedans and nomads but little advanced in civilisation, were cordial; but, said M. Caspari, it must not be forgotten that the character of the natives was naturally warlike, and that they had frequently come into hostile collision with the Egyptians and neighbouring tribes.—In conclusion, a communication was made by M. Henri Coudreau

on the journeys he had accomplished in Guiana during the years 1881 to 1885. During the first part of the time he had travelled among the Galibio from Rocucua on the Iraconbo to the river Kuru, famous for the disaster which took place there in 1763, when 13,000 emigrants from Alsace and Lorraine perished from hunger and distress. The latter part of the time was spent in visiting the interior of the country between the Atlantic and the Rio Negro. As one of the results of his six journeys in Guiana M. Coudreau has brought back materials for two absolutely new maps, one of the region between the Oyapock and Yari, the Amazona, and the Atlantic, and the other of Southern Guiana between the Rio Branco and Paru. Some days previously M. Coudreau had read a paper before the Commercial Geographical Society of Paris, in which, after showing that the climate of Guiana was not so unfavourable as generally supposed, he recommended immigration to the prairies of the country, which were, according to him, very healthy.

Geographical Society of Stockholm.—April 24: Prof. HUGO GYLDÉN, President, in the Chair.—This being the anniversary meeting of the Society, at which the *Vega* medal, struck in honour and commemoration of the expedition in this vessel, is customarily awarded to some explorer for services rendered to geography, the President announced that the Council had decided not to issue the medal this year; not, however, because there was no explorer worthy of it, but because it was considered that the value of the medal would be increased by a year's suspension.—Prof. O. N. Struve (Swede), Director of the Imperial Observatory at Pulkowa, was elected an honorary member for his topographical and astronomical researches.—Dr. Törnebohm gave an account of the famous Colorado cañon in North America.—Prof. v. Düben gave next an account of the operations of some Swedes in the Cameroons, where they had formed a settlement since 1883.—Finally, Prof. H. Hildebrand exhibited some ethnographical objects from the Santal people of India.—The Society then adjourned for the summer recess.

NEW GEOGRAPHICAL PUBLICATIONS.

(By J. SCOTT KELTIE, *Librarian R.G.S.*)

EUROPE.

Nomina Geographica Neerlandica.—Geschiedkundig Onderzoek der Nederlandsche Aardrijkskundige Namen, onder Redactie van Dr. J. Dornseiffen, Prof. J. H. Gallée, Prof. H. Kern, Prof. S. A. Naber en Dr. H. C. Rogge, uitgegeven door het Nederlandsch Aardrijkskundig Genootschap. 1ste Deel. Verbeterde en vermeerderde herdruk. Amsterdam, C. L. Brinkman; Utrecht, J. L. Beijers, 1885: 8vo., pp. 197.

[**Russia.**].—Das Russische Reich in Europa. Eine Studie. Berlin, Mittler und Sohn, 1884: pp. xviii. and 436.

This is a detailed and orderly account of European Russia under the heads of the Country, People, Religion, Classes, statistics of Population, Towns and Villages, Agriculture, Hunting and Mining, Manufactures, Commerce and Trade, Government, Justice, Finance, War department, Culture. Eight pages are devoted to cartography and bibliography. Some of the statistics might have been of more recent date, though on the whole the work is useful as a book of reference.

ASIA.

Cochinchine Française.—Excursions et Reconnaissances. IX. No. 21. Janvier-Février 1885. Saigon, Imprimerie du Gouvernement, 1885.

In the present instalment of this valuable serial publication, the notes on the Laos by M. Etienne Aymonier are continued (pp. 5–130). This is followed by the Report of Dr. W. Burck, Assistant-Director of the Buitenzorg Botanic Gardens, on his exploration of the Padang highlands in search of the species of trees which produce guttapercha (pp. 151–207); Annamite Tales and Legends, second part, by M. A. Landes (pp. 130–151); and Notes on the Reptiles and Batrachians of Cochin China and Cambodia, part third, by Dr. Tirant (pp. 209–246).

Radde, [Dr.] Gustav.—Talysh, das Nordwestende des Alburz und sein Tiefland. Petermann's 'Mitteilungen,' Heft vii., 1885, pp. 254–67.

Talysh is the name by which the mountains around the south-west bend of the Caspian are designated, and this study of the region by Dr. Radde was originally written for the Grand Duke Nicholas Michailovich's great work on "Lepidoptera." Dr. Radde treats in successive sections of its orography, hydrography, and plant and animal life. This last section enters into considerable detail, containing several lists of plants characteristic of the different regions.

Stumm, [Captain] Hugo.—Russia in Central Asia. Historical Sketch of Russia's Progress in the East up to 1873, and of the incidents which led to the campaign against Khiva; with a description of the Military Districts of the Caucasus, Orenburg, and Turkestan. Translated into English by J. W. Ozanne and Captain H. Sachs. Maps, pp. xi. and 359. London, Harrison & Sons. Price 15s.

This is a translation of a German work already in the Library, published in Berlin in 1875. Captain Stumm was a German officer who accompanied the Russian expeditionary force in an official capacity. Apart from a comprehensive summary of the circumstances attending the advance of Russia since the time of Peter the Great, the work contains an interesting account of the military preparations which preceded the expedition to Khiva, and a description of the countries through which it passed to reach its destination. The actual account of the expedition and its results, the translators state, is reserved for a future volume. There is much geographical information concerning the Caucasus, Orenburg, and Turkestan, the information not being brought down to a later date than 1875, some of the statistics being much older. There is a map to illustrate the gradual progress of Russia in Central Asia, and another of Central Asia in 1885, in which the Russian boundary is some 60 miles north of the Zulfikar Pass. The translation is creditably done. There is no index.

Verbeek, R. D. M.—Krakatau. Première partie. Publié par ordre de son Excellence le Gouverneur-Général des Indes Néerlandaises. Batavia, Imprimerie de l'État, 1885, pp. 104.

This is a systematic account of the results of an official investigation into all the circumstances connected with the stupendous eruption of Krakatau in August 1883. The statement when complete will consist of seven chapters; three of them are contained in this part. Chapter I. gives an account of all that was known of Krakatau previous to the great eruption of 1883; Chapter II. describes in detail the eruptions of May 20 and August 26, 1883; Chapter III. deals with the great eruption of August 26–28, 1883; Chapter IV., Mr. Verbeek states, will treat of the probable causes of the volcano's activity during the preceding year; Chapter V. of the various phenomena, terrestrial, marine, and aerial observed during the eruptions; Chapter VI. of the volcanic phenomena observed elsewhere in the Indian Archipelago at the time of the eruption; Chapter VII. will be devoted to an explanation of the numerous maps and plates which will accompany the report, none of which are in the present instalment.

AFRICA.

Greswell, William, [M.A., F.R.C.I.]—Our South African Empire. Two vols., pp. xxii. and 317, 323. London, Chapman & Hall, 1885. Price 21s.

Mr. Greswell's work is more of political and social than of purely geographical interest. It is mainly an historical sketch of the various South African States from the Dutch occupation down to the present day, very considerable space being devoted to the Frere administration and the life and work of Sir Bartle Frere. Throughout the work are numerous sketches of the social condition and customs of the various peoples at various periods; chapters on forms of government in South Africa, on Basutoland, the Germans in South Africa, Imperial Federation, and Education (in which the author does not speak in very glowing terms of the Cape "University"). The book is interestingly written, and will be found a useful if not altogether impartial historical summary of South African history. There is a map (125 miles to an inch) of the region south of 20° S. lat.

Joest, Wilhelm.—Um Afrika. Illustrations and map (1 : 25,000,000), pp. vi. and 315. Köln, Dumont Schauberg, 1885. Price 8s.

These are a series of sketches originally sent home to the *Kölnische Zeitung* last year, during the author's voyage round Africa and his tour through the south-eastern part of the Continent. A considerable portion of the volume is devoted to South Africa—Cape Town, the interior, Kimberley, the Boers, Basutoland, Natal. Herr Joest also touched at Lourenço Marques, Mozambique, Zanzibar, and Aden. His book is pleasant reading, and the numerous photographic illustrations are attractive.

Reiter, [Dr.] Hanns.—Die Kalahara. Ein Beitrag zur vergleichenden Länderkunde. Zeitschrift für Wissenschaftliche Geographie, Band v. Heft 5 und 6, pp. 316–27. Vienna, Hölzel, 1885.

This is the concluding instalment of a very thorough and instructive discussion of the question of the origin of the Kalahari Desert. Dr. Reiter has collected from all sources an almost exhaustive array of information on the characteristics of the Desert, and the opinions of specialists as to its origin. This last instalment contains a chronological review of the theories on the origin of the Kalahari, with a criticism of them, and an attempt by the author to solve the problem. He seeks for the origin of the Desert in the changes in climate, moisture, and elevation of the surface which have taken place during past geological periods.

Tissot, Charles.—Exploration Scientifique de la Tunisie. Géographie comparée de la Province Romaine d'Afrique. Tome Premier:—Géographie Physique.—Géographie Historique.—Chorographie. Paris, Imprimerie Nationale: pp. viii. and 697. Price 13s. 6d. (*Dulau*.)

This is one of a series of volumes issued by the French Ministry of Public Instruction; unfortunately its accomplished author died a few days before its publication. The second volume, however, it is announced, containing a description of the network of routes through the ancient province, is completed in manuscript, and will be issued as it left the hands of the author. The treatise, a monument of careful and minute research, has been the work of thirty years, frequently interrupted. The author's object has been to free the comparative geography of Northern Africa from the many errors which encumber it, to compare the ancient texts with the indications collected on the spot, and thus to furnish a solid basis for further research. M. Tissot takes Roman Africa in its widest sense, when it included Numidia and Tripoli, and his treatment of the subject is both scholarly and scientific. In the present volume are several special maps and plans and reproductions of ancient monuments; but no general map. M. Tissot adheres to the belief that there was a veritable Atlantis, a continent lying to the north-west of Spain, of which only a few islands remain. But we believe he is mistaken in claiming for this belief the support of all reputable geologists.

GENERAL.

Fritsche, [Dr.] H.—Ein Beitrag zur Geographie und Lehre vom Erdmagnetismus Asiens und Europas. Petermann's 'Mittheilungen,' Ergänzungsheft No. 78. Gotha, Justus Perthes: pp. 73. Price 5 Mark.

Dr. Fritsche was for sixteen years (1867–83) Director of the Imperial Russian Observatory at Pekin. During twelve of these years he resided at Pekin itself, while the other four years he spent partly in St. Petersburg, and partly in journeys through the Chinese Empire and Siberia, for the purpose of inspecting the Meteorological Observatories at Katherinenburg, Barnaul, and Nerchinski-Sawod, and founding new stations; but principally to make astronomical-geographical and hypsometrical observations, and to ascertain the three elements of terrestrial magnetism at as great a number of places as possible.

Dr. Fritsche's monograph on the geography of terrestrial magnetism is divided into two leading sections:—I. Geography; II. Terrestrial Magnetism. Under the former he treats (a) of the astronomical and meteorological instruments used by him in his investigation; (b) the astronomical-geographical observations carried out at Pekin; (c) the similar observations carried on during Dr. Fritsche's journeys, the instruments used, and the methods of observation and computation; (d) heights above sea-level and route-surveys; (e) temperatures of spring-water observed during his journeys, and on the temperature of the soil at Pekin; (f) comparison between Dr. Fritsche's observations and those of later date. Under the second section we have (a) instruments and methods; (b) the Pekin magnetic observations; (c) magnetic measurements taken during his journeys; (d) secular variations of the three elements of terrestrial magnetism. The maps are a sketch map of the journeys in Siberia and China (1:12,500,000); Routes in North-East China, Manchuria, and the Gobi, 1873–83 (1:2,500,000); Route from Pekin to the Hoang-ho and back, April 1883 (1:1,500,000); Routes in the West from Pekin, 1882 (1:750,000); Routes in the Shantung province, August and September, 1871 (1:1,500,000).

Geikie, Archibald, [LL.D., F.R.S.]—Text-book of Geology. With Illustrations. Second edition, revised and enlarged. London, Macmillan & Co., 1885: 8vo, pp. xvi. and 992. Price 28s.

A second edition of this work has been necessary within two years, and Mr. Geikie has taken the opportunity of considerably enlarging it. It is a systematic and detailed treatise on the subject, and has already taken its place as the leading English text-book for advanced students and book of reference for all who have to deal with higher geology. After an Introduction the work is divided into seven Books:—I. Cosmical Aspects of Geology; II. Geognosy, an Investigation of the Materials of the Earth's Surface; III. Dynamical Geology; IV. Geotectonic (Structural) Geology, or the Architecture of the Earth's Crust; V. Palæontological Geology; VI. Stratigraphical Geology; VII. Physiographical Geology. There are about 450 illustrations.

Gelcich, [Prof.] Eugen.—Vermischte Studien zür Geschichte der matematischen Geographie. Zeitschrift für Wissenschaftliche Geographie, Band v. Heft 5, pp. 291–315. Vienna, Hölzel, 1885.

Haas, [Dr.] Hippolyt.—Ueber den heutigen Stand der Glacialgeologie. Zeit. für Wiss. Geographie, Band v. Heft 5, pp. 365–73. Vienna, Hölzel, 1885.

Krafft, Hugues.—Souvenirs de Notre Tour du Monde. 24 phototypes et 5 cartes. Paris, Hachette et Cie., 1885: pp. 399.

This is the narrative of a journey round the world by M. Krafft and two friends, which lasted eighteen months. It is in the form of a series of letters, from the dates of which the last figure of the year is, for some unaccountable reason, omitted. The countries visited were India, Ceylon, Cochin China, Java, China, Japan, and America. M. Krafft has, of course, nothing new to tell the geographer; but his narrative is full of interest, his observations shrewd and sensible, and his style quiet. The phototypes are beautifully executed, and the maps worthy of Hachette and Co. The maps are Hindostan, Java, Coast of China, South and Central Japan, and a planisphere showing the route of the travellers.

The "Challenger" Expedition.—Report on the Scientific Results of the Voyage of H.M.S. "Challenger" during the Years 1873-76, under the Command of Captain George S. Nares, R.N., F.R.S., and the late Captain Frank Tourle Thomson, R.N. Prepared under the Superintendence of the late Sir C. Wyville Thomson, Knt., F.R.S., &c., and now of John Murray, one of the Naturalists of the Expedition.—Narrative . . . With a General Account of the Scientific Results of the Expedition. By Staff-Commander T. H. Tizard, R.N.; Professor H. K. Moseley, F.R.S.; Mr. J. Y. Buchanan, M.A.; and Mr. John Murray, F.R.N.: Members of the Expedition. Partly illustrated by Dr. J. J. Wild, Artist to the Expedition. Vol. I, First Part, pp. liv. and 509; Second Part, pp. viii. and 510-1110. 4to. Price 6s. 16s. 6d.—Botany. Vol. I, pp. xi. and 75, 135, 299, 335. 4to. Price 40s. Published by order of Her Majesty's Government. London, Longmans and Co., &c., 1885.

Several portions of the second volume of the "Challenger" Narrative have been already issued, in the form of special memoirs on magnetical, meteorological and other results. The whole of the narrative proper is contained in the great volume of over 1000 pages before us, in itself a monument to the organisers and conductors of the Expedition, and a credit to the Government that subsidised it. It would be hopeless to attempt to give the barest analysis of the narrative in the space at our disposal: to quote the Scotchman's description of his national haggis, "It's fine confused feeding." The narrative is chronological, and embraces the general results, it may be said, of almost every day's work throughout the voyage, in every department of research—topography, biology, meteorology, geology, ethnology, and what the Germans comprehensively call oceanography. This is the section of the great undertaking which will have special interest for the geographer. Not only does the narrative deal specially with the more strictly geographical results of the expedition, but the hundreds of illustrations, photographs, steel plates, and woodcuts, in themselves afford realistic glimpses of far-off lands, seas and peoples, which must form a liberal education to the stay-at-home geographer. There are 14 chromolithographic plates; 36 photographic plates; 43 charts: 22 diagrams showing the vertical distribution of temperature in the ocean; 340 woodcuts; and 22 tail-pieces. The maps include a large Physical Chart of the World, on which the track and the soundings of the *Challenger* are shown as a whole; the special charts exhibiting on a much larger scale the particular sections.

The whole of the first volume of the Botany is by Mr. W. Botting Hemslay of Kew. The sections are as follow:—I. Report on Present State of Knowledge of Various Insular Floras, being an Introduction to the first three parts of the Botany of the *Challenger* expedition. II. and III. Report on the Botany of the Bermudas and various other islands of the Atlantic and Southern Oceans. IV. Report on the Botany of Juan Fernandez, the South-eastern Moluccas, and the Admiralty Islands.

Kennedy, [Capt.] W. R.—Sport, Travel, and Adventure in Newfoundland and the West Indies. Edinburgh and London, W. Blackwood & Sons, 1885: pp. x. and 399, post 8vo., map and illustrations. Price 14s.

This volume contains a narrative of H.M.S. *Druid's* commission, which extended over a period of three and a half years (1879-1882) on the North American and West India stations. It contains a very good account of Newfoundland, its fishing treaties, climate, the interior, the aborigines, sport, &c., being all dealt with by the writer, whose object is to give his readers a better idea of the island. Descriptions are also given of the various places visited in the West Indies, &c., which include Bermuda, Jamaica, Belize, Cuba, the Spanish Main, Haiti, San Domingo, the islands off the Mosquito coast, and Grand Cayman.

NEW MAPS.

(By J. COLES, *Map Curator* R.G.S.)

EUROPE.

Thüringer Waldes.—Die Thalsohlen-Gefälle des ——. Entworfen und gezeichnet v. Dr. Paul Stange. Petermann's 'Geographische Mitteilungen,' Jahrgang 1885, Taf. 13. Justus Perthes, Gotha. (*Dulau.*)

AFRICA.

Afrika.—Kultur- und Staaten-Karte von ——. Von Prof. Dr. Fr. Ratzel. Scale 1 : 45,000,000 or 619 geographical miles to an inch. 1. Skizze einer Kultur-Karte. 2. Skizze der Staatenbildenden Völker und der Eingeborenen-Staaten. Petermann's 'Geographische Mitteilungen,' Jahrgang 1885, Taf. 12. Justus Perthes, Gotha. (*Dulau.*)

Senegal.—Colonie du ——. Possessions Françaises de la Côte Occidentale d'Afrique depuis le lac Téniahié jusqu'à Sierra-Leone; à l'usage des écoles de la Sénégambie avec approbation du Comité de l'Instruction Publique par C. Mathieu, officier d'Académie, Ancien Directeur du Collège de Longwy, Professeur de l'Enseignement Secondaire à St. Louis (Sénégal) 1884. Publiée avec l'approbation de la Société de Géographie de Paris. Challamel Ainé, Paris. Scale 1 : 1,350,000 or 18·4 geographical miles to an inch. Price 10s. (*G. Philip & Son.*)

Though this map, as shown by its title, is intended for use in the schools of the French Colony of Senegambia, it will be found extremely useful to all who have any interest in that part of Africa, or who desire to study its geography. It contains inset plans on enlarged scales of Dakar, Saint Louis, and of the French fort at Bammaku on the Niger; and two inset maps, one of the Cape de Verd Islands, and the other of the Island of Goree.

The map is drawn in a bold style, and the lettering is clear and well placed.

South Africa.—Juta's Map of ——, containing Cape Colony, Natal, South African Republic, Orange Free State, Griqualand, Kaffraria, Basutoland, Zululand, Damaraland, Betschuanaland, and other Territories. Compiled from the best available Colonial and Imperial information, including Dr. T. Hahn's Damaraland, and the Official Cape Colony Map by the Surveyor-General, Cape Town. New and revised edition. Scale 1 : 2,500,000 or 34·4 geographical miles to an inch. Published by J. C. Juta, Cape Town. 1885. Price 10s. 6d. (*Stanford.*)

This is a revised edition of Juta's map of South Africa, and contains several important corrections in the topography, principally in the features of Great Namaqua Land. The extension of the railway system, the limits of the British Protectorate in Betschuanaland, and the British Reserve in Zululand are all shown, and, though the scale on which it is drawn is small, this is a very useful map, containing as it does the most recent information as to the geography of South Africa.

AMERICA.

Canada.—Map of the Province of Manitoba and part of the North-West Territories of ——, showing Dominion Land Surveys to December 31st, 1884. Published by order of the Hon. Sir David L. Macpherson, K.C.M.G., Minister of the Interior. Compiled and drawn under the direction of E. Deville, F.R.A.S., F.R.S.C., Chief Inspector of Surveys. Scale 1 : 775,000 or 10·6 geographical miles to an inch. Department of the Interior, Ottawa, 31st December, 1884.

This map, which shows the state of the surveys at the close of last year, is published on a larger scale than any hitherto issued by the Department of

the Interior, of this portion of the Dominion. Provinces, Counties, Land Districts, Indian Reserves, and Coal Districts, are all indicated by a system of colouring. Much general information with regard to the positions of Post Offices, Police Stations, and Townships, together with the main traits connecting them, is given. It is drawn on three sheets, which together constitute a very useful map for general reference, and it is to be hoped that before long the map may be extended so as to include British Columbia, a reliable map of that Province being very much needed.

CHARTS.

Admiralty.—Charts and Plans published by the Hydrographic Department, Admiralty, in May and June 1885.

No.		Inches.	
1445	m	=	6·7 Scotland, east coast:—Arbroath, 1s.
2499	m	=	1·9 Ireland, north coast:—Lough Foyle. 2s. 6d.
900	m	=	5·8 Magellan strait:—Notch cove. 1s.
2523	d	=	2·0 Red sea:—General chart. 2s. 6d.
2637	m	=	0·1 China sea:—South part of the strait of Macassar. 2s. 6d.
94	m	=	0·21 China sea:—Paracel islands (plan Woody island). 1s. 6d.
1212	m	=	0·04 New Zealand:—General chart. 2s. 6d.
1112	m	=	1·0 South Pacific ocean:—Manga-Reva or Gambier islands. 6d.
604	Cape Lopez bay to St. Paul de Loanda:—New plan. St. Paul de Loanda harbour.		
81	Mersa Durúr to Trinkitat:—Plan added. Mersa Sheikh Sa'd.		
71d	Madras to point Calimere:—Plan added. Negapatam and 'Nagore anchorages.		
1040	Avatcha bay:—New plan. Petropaulski harbour.		
2535	Manukau harbour to cape Egmont:—Plan added. Mokau river.		
984	Wotje or Romanzoff island:—Plan added. Jalút island.		
1730	Samoa or Navigator islands:—Plans added. Leone bay. Hübner bay.		
	(J. D. Potter, agent.)		

CHARTS CANCELLED.

No.		Cancelled by	No.
1445	Arbroath harbour	New plan, Arbroath	1445
2499	Lough Foyle	New plan, Lough Foyle	2499
2523	Red sea	New chart, Red sea	2523
2637	South part of the strait of Macassar	New chart, South part of the strait of Macassar	2637
94	Amphitrite islands	New chart, Paracel islands	94
95	Paracel islands		
1212	New Zealand	New chart, New Zealand	1212
1112	Manga-Reva or Gambier islands	New plans, Manga-Reva or Gambier islands	1112

CHARTS THAT HAVE RECEIVED IMPORTANT CORRECTIONS.

No. 1828. England, east coast:—The Downs. 2151. England, Thames river:—Gravesend reach. 1777. Ireland, south coast:—Queenstown harbour. 1765. Ireland, south coast:—Cork harbour. 1406. North sea:—Dover and Calais to Orfordness and Scheveningen. 1872. North sea:—Calais to the river Schelde entrance. 122. North sea:—Mouths of the Maas. 126. North sea:—Heligoland. 124. North

sea:—Texel. 2247. Baltic sea:—Hogland to Seskar, north shore. 2297. Baltic sea:—Hango head to South Quarken. 2602. France, north coast:—Cherbourg. 2664. France, west coast:—D'Arcachon point to Coubre point. 2177. Arctic sea:—Baffin bay. 2491. North America, east coast:—Approaches to New York. 499. West Indies, St. Lucia island:—Port Castries. 2434. West Indies:—Cartagena harbour. 494. West Indies:—Ports and anchorages in Martinique. 1373. South America:—South-east part of Tierra del Fuego. 21. Magellan strait:—Second Narrows to cape Pillar. 591. North America, west coast:—San Francisco harbour. 942b. Eastern archipelago:—Eastern portion. 933. Java, north coast:—Batavia road. 1985. China:—Hai-tan strait. 1256. China:—Pechili and Lian-tung gulfs. 1761. China:—Port Matheson to Ragged point. 2388. Tartary:—Sea of Okhotsk. 452. Japan:—Yezo island. 2123. New Guinea:—Orangerie bay to Bramble haven. 2124. New Guinea:—Bramble haven to Rossel island. 1030. Australia, east coast:—Great Sandy strait, northern portion. (*J. D. Potter, agent.*)

United States Charts.—No. 925. United States of Colombia. Savanilla Harbour. From the latest Surveys with corrections by U. S. S. Albatross, Lieut.-Commander Z. L. Tanner, Commanding. March 1884. Price 1s. 3d.—Pilot Chart of the North Atlantic Ocean. No. 7, July 1885. U. S. Hydrographic Office, Washington D.C., Commander J. R. Bartlett, u.s.n., Hydrographer. 1885.

North America.—Sixteen Maps accompanying Report on Forest Trees of —, exclusive of Mexico, by Prof. C. S. Sargent. Scales 1 : 15,000,000 or 205·4 geographical miles to an inch, and 1 : 6,600,000 or 90·4 geographical miles to an inch. Department of the Interior, Census Office, Washington, D.C.

This Atlas, like all others which have been published by the United States Government, is a beautiful specimen of cartography, and contains a vast amount of valuable information on the subject it deals with. The following list of maps clearly indicates the nature and scope of the work.

- No. 1. Map showing the position of the Forest, Prairie, and Treeless Regions.
- No. 2. Map showing the Natural Divisions of the North American Forests.
- No. 3. Map showing the distribution of the Genus *Fraxinus* (the Ashes).
- No. 4. Map showing the distribution of the Genera *Carya* and *Umbellularia* (the Hickories and California Laurel).
- No. 5. Map showing the distribution of the Genus *Juglans* (the Walnuts).
- No. 6. Map showing the distribution of the Genus *Quercus* (the Oaks).
- No. 7. Map showing the distribution of the Genera *Castanea* and *Castanopsis* (the Chestnuts and Chinquapins).
- No. 8. Map showing the distribution of the Genus *Pinus* (the Pines).
- No. 9. Map showing the distribution of the Genera *Abies* and *Picea* (the Firs and Spruces).
- No. 10. Map showing the distribution of *Liriodendron Tulipifera* and *Pinus Lambertiana*.
- No. 11. Map showing the distribution of *Prosopis Juliflora*, *Quercus Alba*, and *Q. Densiflora*.
- No. 12. Map showing the distribution of *Fraxinus Americana* and *Pinus Ponderosa*.
- No. 13. Map showing the distribution of the Genera *Chamæcyparis* and *Cupressus*.
- No. 14. Map showing the distribution of the Genera *Thuja* *Taxodium* and *Sequoia*.
- No. 15. Map showing the distribution of *Pinus Strobus*, *P. Palustris*, and *Pseudotsuga Douglassii*.
- No. 16. Map of the United States showing the relative average density of existing Forests.

RORAIMA AND KUKENAM M^{TS} AND THE SURROUNDING COUNTRY.

Surveyed by M^r H.J. Perkins
Under the Direction of M^r Everard im Thurn
1885.

Heights in Feet
Scale of English Miles





PROCEEDINGS
OF THE
ROYAL GEOGRAPHICAL SOCIETY
AND MONTHLY RECORD OF GEOGRAPHY.

Countries and Tribes bordering on the Koh-i-Baba Range.

By Major-General Sir PETER LUMSDEN, K.C.B.

(Read at the Evening Meeting, June 22nd, 1885.)

Map, p. 624.

On the 25th November last, the Afghan Boundary Commission crossed over the Koh-i-Baba Mountains by the Chashma Sabz Pass, and it is to the country, and also to the tribes inhabiting the northern slopes of this range that I desire to draw your attention this evening. The general character of all the countries in the vicinity of Herat has lately been placed before you by General Walker, I shall therefore confine myself as far as possible to the relation of such matter as has not hitherto been brought before the public, and to the correctness of which I and those officers whom I quote, can from personal experience testify.

To you accustomed to dwell in England, and happily ignorant of all the horrors involved in the dreaded "Alaman," or Turkoman raid, a map of a country swept by these raids is difficult to comprehend; in such a district names do not signify towns or villages, but merely the sites where they once existed, marked perhaps by mounds delineating the ground-plan of forts, caravanserais, houses, or tanks, but of which no other traces now remain. Of the former inhabitants, frequently the only records are the tombstones of their burial-places, from some of which data may be secured in marking the period when they were swept into slavery or destroyed. For instance, in the tract of country between Gulran and the Kushk river, the last inhabitants were Uzbek and Hazara, and on the tombstones of their dead were dates extending as nearly as possible over a century, viz. from A.D. 1650 to 1750.

Another difficulty to the geographer is, that there are generally two names for each stream or location; the first, the traditional one known to Afghan and Persian, and frequently of Arab or Persian origin, the second that by which it may be known to the Turkoman shepherds, or sirdars, who alone traverse these little frequented routes. Thus the

valley which carries down the collected drainage of the Gulran and Assya Deb plateaus is called Dahna Islim by the Afghans, and Yegri Gueuk by the Turkomans; the Pul-i-Khisti, in the same way, of the Afghans is the Tache Keupri of the Turkomans.

Along the northern base of the Koh-i-Baba are a succession of once fertile valleys, through which run streams formerly used for irrigation. The marks of watercourses point out the lines of ancient channels, whilst in many places karezes, that is subterranean canals, indicate a state of past prosperity, and extensive cultivation. Towers and walls still existing of forts, show that even in those far distant days property required protection; and, as on the site of the old castle of Gulran, the skulls and skeletons scattered over it seem to indicate that indiscriminate slaughter must frequently have attended the destruction of localities long since untenanted.

Leaving Gulran to the left, the valleys of Assya Deb, Karabagh, Ak-tachi, Tu-tachi, and Kara-su succeed each other along the route to Kara-tepeh on the river Kushk.

The small streams which issue from springs in the mountains supply excellent fresh water; but the water becomes salt and brackish so soon as it touches a stratum of salt deposit which crops up some 10 or 15 miles north of and parallel to the range; thus below Gulran and from thence to Chaman-i-Bed at the junction of the Dahna Islim with the Kushk, the water is salt and undrinkable, and but one fresh-water spring presents itself at Chashma Islim. All this country is grazed over by the Afghan flocks from Kuzan and the valley of the Heri-rud south of Koh-i-Baba, and by those of the Hazaras of Kala Nau and Jamshidis of Kushk. It is a portion of Badghis.

The valley in which the Jamshidi settlement of Kushk is situated is about 14 miles long, of an average width of three-quarters of a mile; the hills are of low rounded clay, bare of trees, their sides dotted with villages of domed mud cabins. The irrigation from the river is profuse, and there is much cultivation on the top and sides of the hills, where rain crops are grown. Some 20 miles to the eastward of Kushk runs the watershed dividing the Jamshidi from the Hazara country. From the top of the Zindah Hashim Pass, about 6000 feet above the sea, we had a very fine view. The Hazara country, a vast plain inclining towards the north, eroded by the Murghab drainage into a chaos of steep hillocks and hollows, lay at our feet, stretching away in wild confusion to the foot of the Tirband-i-Turkistan. The view was weird and desolate. As we descended the sides of the mountains, well clothed with juniper, we saw that the soil was excellent, and that manual labour alone was required to turn much of this sterile waste into luxuriant fertility. The valley of Kala Nau very much resembles that of Kushk, except that it is smaller and more healthy. The villages are partly mud houses and partly kibitkas, and as in Kushk, the chief

lives in a fort. The Hazaras are very prosperous—their land is exceedingly fertile, they have not much more to do than to sprinkle seed on the hill-tops and wait for the friendly rain ; and then, as they say, reap a hundredfold. Their chief wealth is, however, in cattle ; of sheep they have enormous flocks. Perhaps I cannot better make you realise the view and general aspect of Badghis, than by giving you a description, penned at the time by Captain Durand, of a visit made by me with a small party in December last to the summit of the Karajungul, a peak of the Tirband-i-Turkistan, some 20 miles distant from our camp at Bala Murghab : it is as follows :—

“On Monday, December 22nd, the Persian mules came jingling up for the light tents, and the caravan was soon on its way. These mules are grand beasts ; each lot of them has a pony as leader with great bells on him, and the mules having a wonderfully musical ear, discriminate at once between their leader's bells and any others, and they follow at such a pace that they do the march as quickly as you do.

“People here say we may possibly have only one fall of snow, and that it should come soon and practically end the winter before all the little crocuses come out, which they are doing fast—delicate little yellow fellows with their transversely ribbed spiky leaves. We are promised that we shall have a garden of wild flowers all round us in a few days without the trouble of tilling the soil, and I have no doubt the promise will come off.

“A ride of 15 or 16 miles up a narrow valley going east from Bala Murghab landed us at a group of kibitkas, curiously enough just undergoing the change into house formation, which would no doubt have interested Mr. Fergusson. But cave dwellings were also in the same group, and little boys and girls came bolting out of the sandhills like rabbits. Here we found water and pitched our camp.

“The next morning we started about 7 o'clock, and rode up the streamlet for a mile, noticing what looked very like blackberry brambles, and rose trees, and we heard a little fraud of a nightingale imitating at some distance the song of the Persian one, who again is only Brummagem when compared with the real article. The little impostor called himself Bulbul-i-Sang-Shikan. Then we saw some blackbirds, quite life-like, only bluer, and a very big black robin. Luckily for these, our naturalist was not of the party. After getting into the mouth of the pass we began to ascend the hills and to see game at once, and before we had gone a mile all the advanced guard were off their horses, and stalking wild sheep. This range of hills is called the Karajungul, and its summits are probably some 7500 feet above sea-level. We rode up it all.

“Pistachio trees and junipers were the commonest trees, though there were a few firs, and the grass was delicate turf and apparently excellent grazing ground. I saw assafetida also in one or two places. The plateau was covered with herds of ibex and wild sheep, and we saw a

drove of about forty boar, great big fellows not running violently down any steep places at all, but going sulkily across our line. Then we had our guns placed along the top of a perpendicular cliff and waited—some of us waited a long time, for nothing came our way at all, the wind setting from us to the west, but we saw the herds of animals crossing the amphitheatre below us, and ascending the cliffs further on, make over the plateau and break away safely; that is the bulk of them did so, but the guns at the further end had some good sport. It was an odd sight, wild sheep and ibex, pigs, wild Jamshidis, Persian servants, and breakfast all on the plateau at the same time.

“After breakfast we strolled across the heights and enjoyed a magnificent and curious view.

“The sheer cliffs of the Karajungul, facing south, went down below us, whilst the long range of the Paropamisus, or more properly the Elburz, stretched along the whole southern horizon from west to east, where it appeared to close on to a high snow-covered mountain, a hundred miles at least away, called Ischalup or Band-i-Sakha, supposed to be the cradle of the Murghab and Heri-rud. The former we saw as a silver thread breaking through a black gap in a range to the south-west of us, but it must turn there as we saw gap after gap in other ranges all leading up towards the high mountain.

“That same white mountain must be one of the highest peaks of the watershed between the Aralo-Caspian basin and the Bay of Bengal. Between us and the Elburz range, some eighty miles south, were crowded masses of lower ranges and sometimes apparently parallel ranges, the country of the Feruzkohi, probably never before looked down upon by Europeans. Turning to the north showed you, beyond the plateau itself, nothing but endless waves of sandhills going away into the dim horizon. It looked as if the goddess Kali had spread her pock-marked pinions over all to the northwards; no peaks stood prominently out anywhere, but pitted sandhills going on for ever. When we were quite tired of asking questions and looking at the magnificent panorama, we all took different ways and strolled down the hill-side to our camp.”

Between the valley of the Murghab and that of the Kushk a tributary stream runs down the valley of Kushān, which is usually brackish and sometimes dry, but in February, when we crossed, it was carrying along a considerable body of water. The valley at that season was literally covered with Turkomans with their ploughs, turning over the soil. I was assured that here, as in many other places, cultivators of unirrigated land got a return of seventy to a hundredfold. Yet, with all this return, it is stated that Penjdeh does not produce sufficient for the requirements of its own home consumption, and that grain can generally be imported at a cheaper rate from Maimana and Afghan Turkistan than it can be grown on the spot.

In the lower valley of the Kushk cultivation scarcely extends up to Chaman-i-bed, though there may be a few fields turned over in Kara-tepeh.

Badghis has been, as far back as even the earliest periods of Arabic history, a province of, or connected with Herat.

It comprises the lands watered by the Murghab river, including the Kushk and all other tributaries, together with grazing lands extending from the Heri-rud river on the west, to a day's journey for flocks to the east of the Murghab.

In earlier times it included Yulatan, but since the time of Khivan supremacy, when the cities were destroyed, the tract of cultivation between Penjdeh and Yulatan has remained fallow, and beyond the traces of early canals presents no vestige of former occupation, and has become desert. Penjdeh is the principal valley of Badghis, and may be described as that portion of it watered by an extensive system of canals, which formerly issued from the dam known as the Band-i-Nadir, some eight miles north of Maruchak on the Murghab river.

The Murghab is a beautiful river, flowing in deep beds of sand and alluvial deposit, with an average width of 60 to 80 yards, and only fordable, even in winter, in a few places.

The Afghan forts of Bala Murghab and Maruchak are the only modern buildings north of the debouch of the river from the gorge in the Tirband-i-Turkistan. The cave habitations existing near Bala Murghab, and those extensively excavated and explored by Captain de Laessø at Bash-do-Shik and elsewhere point to times of Buddhistic occupation. At Bala Murghab, Karawal Khana, Maruchak, and Penjdeh, besides in several other places, there are foundations marking the existence of former permanent bridges across the Murghab; and extensive remains of large towns at Penjdeh, Kala-i-Maur, Maruchak, and Karawal Khana indicate a state of prosperity once existing in these valleys which has long passed away.

Maruchak at one time must have been a much larger place than it is now. It is supposed by some to indicate the position of the ancient Merv-i-rud; and notwithstanding the fact that philologists have deduced various learned derivations for its name, I think ordinary individuals may accept the origin as given to me by a learned Eastern authority as derived from *maru*, the Turki for "lady," and *chak*, "fat;" and that the fair daughter of the Persian monarch, after whom it was named, must have been a damsel of no mean proportions.

Burnes, in his 'Bokhara,' quotes a Persian proverb reflecting on the proverbial insalubrity of this Naboth's vineyard, "Maruchak": "Before the Almighty can get intelligence, the waters of Maruchak have killed the stranger."

The Jamshidi and Saryk Turkoman population of the Murghab valley live entirely in kibitkas, or felt tents. Kibitka is the Russian name;

they are called *eo* by the Turkomans, and *khirga* by the Afghans, and they form a very roomy, comfortable substitute for tents, as experienced by many of the officers who lived in them throughout the rigorous winter. A collapsible lattice-work ring, some five feet in height, is set up, and to this are attached supports for the roof, all tending inwards and all joined by a crown, which acts in the same manner as the keystone of an arch; the whole structure is then covered with thick and durable felt, impervious to wind and wet.

It is some twenty-eight years since the Saryks, having been driven out of Merv by the Tekkeh Turkomans, received the sanction of the Jamshidi chief, and located themselves in Penjdeh. There are some 7300 families settled in Penjdeh, with about 4000 in Yulatan; they are subdivided into six factions—Sukhti, Hazurghi, Dudakli, Khorasanli, Alishah, and Biraj. Their encampments of kibitkas present the appearance of beehives or wigwams, and are anything but picturesque; the dwelling of the chief is distinguished by a scroll, some two feet deep, worked in carpet work, and placed round the top. The entrances to these kibitkas are closed by a *purdah*, whilst inside, the kibitka is generally adorned by carpets on the ground, a dado of carpet-work running round the walls at a height of from three to five feet, and bags of the like material to contain the work of the fair (!) inhabitants hung on the walls: these bags are from four to six feet long and two to three feet deep. All the carpets, &c., I have mentioned are the work of the women. I think you will all agree that they are very beautiful, and I believe for taste in their execution and for durability of material they are not to be surpassed.

There is a marked difference between the Afghans and Turkomans. In Penjdeh we scarcely ever saw an armed man, and found the Saryks, instead of being the dreaded alaman-sweeping and slave-dealing people we came to see, an industrious hard-working race, at that time busy from morning to night in the excavation and clearing of their canals, always moving about with a spade having a somewhat triangular shaped blade continually across their shoulders. The Saryks are stalwart men of good physique, resembling very much in character the Turks. They are a shrewd, hard-headed, practical people, and continually expressed their desire for security and permanent settlement.

These Saryks, along with their brethren of the Tekke, Salar, and other Turkoman tribes, had been for a century the scourge of Northern Persia; they had swept the inhabitants away from valley after valley down the Heri-rud, almost as far as Seistan and westward, within 150 miles of Teheran itself. From the slave trade and plunder secured in these raids they had amassed comparatively great wealth, and they certainly seemed better off than most Asiatic races.

The slave trade and raiding having been entirely abolished owing to the action of Russia, and the closing of the markets, these Turkomans

now eagerly seek for a source from which they can secure wealth, and maintain their present prosperity. They own great herds of sheep, amounting in 1884 to an aggregate of 194,250, divided into flocks of from 700 to 1500 each, for which there is a herdsman who gets 10 tillas half-yearly, whilst assistants, according to the strength of the flocks, get 4 tillas each.

They have hitherto generally disposed of their sheep in the Bokhara and Urgunj markets. On the spot the price of sheep is from 4*s.* to 8*s.* 6*d.*, according to age and quality, the latter sum being the price for a four-year old; camels fetch about 6*l.* 10*s.*; horses from 13*l.* to 25*l.*; bullocks 2*l.* 10*s.* to 3*l.*; cows 2*l.* to 2*l.* 10*s.*; and goats from 4*s.* 6*d.* to 6*s.* In summer their camels suffer from the sting of a fly called *googweer*, which apparently poisons the blood, the animals fall off in condition and die in the ensuing spring.

The trade of Penjdeh is carried on entirely by Jews, of which there are some twenty families settled there; they are offshoots from the Jewish colony at Herat. About 350 families form this colony; some 200 of these sought refuge in Herat from the persecutions carried on against their tribe at Meshed in 1862; they are known as Kasvini Jews, having originally been deported by Nadir Shah from Kasvin to Meshed. The remaining families are said to have been in Herat for many generations, they have generally been well treated there. Many of them about the beginning of the century came from Yezd and other parts of Southern Persia. They have in their hands most of the trade with Balkh, Bokhara, Khiva, and Merv. When the slave trade prospered they were the agents through whom all transactions for ransoms used to be effected, and they still continue to hold the property of many members of the tribes in pledge, in return for ransoms—that is, if the tales of respectable gentlemen whom we not unfrequently met in our rides were to be believed, and who, putting on a woful aspect, used to address us with the petition, “Help me! I am unhappy, I am in debt, owing to having had to borrow money for the redemption from slavery of myself,” or sometimes it would vary and be for a wife or daughter.

We were altogether disappointed in the Turkoman horses, and endeavoured in vain to procure or see any valuable animals. The Turkoman horse has secured a reputation for great endurance from the distances they were known to have traversed in the raids, and which average fifty or sixty miles a day, for some days; but to effect this the horses were carefully trained to the hardest condition, and moved at a pace rarely exceeding four miles an hour, by which means they were enabled to travel from sixty to seventy miles in sixteen hours, and I am convinced that any horses can accomplish the same feat under similar conditions. It is accepted that the best of these horses are to be found with the Akhals and near the Caspian Sea, and that the breed deteriorates in quality as you proceed eastward, the Tekke being superior to the

Saryk, and the Saryk to the Ersari horses. I think the value of the breed depends entirely upon the amount of Arab blood in its veins, and that the possible decrease in the quality eastward may be ascribed to increasing distance from the centre which has given all the value attributed to these horses, namely from Arab stock. The Turkomans give their horses water as often as they will drink, but at all times after drinking put them into a gallop until perspiration breaks out. They cover them summer and winter with great quantities of felt clothing, which has a tendency to make them delicate and invariably wears off their manes, and from their being brought up on a sandy soil, their hoofs are brittle and come to pieces on rocky or hard surfaces. Altogether the conclusion arrived at by the officers with me, and I believe also by the Russians, is that the Turkoman horse has altogether been overrated, and that in many respects he is inferior to the numerous herds bred in more mountainous tracts such as the Kuttighani of Afghan Turkistan.

The Turkomani women do a vast amount of work: they fabricate carpets, purdahs for doors, work bags, horse-clothing, nummads and blankets, and when a young woman is engaged it is thought to be the right thing for her to work all the kikitka domestic carpets and other household requisites before she is married. When, however, they do marry without having completed this task, it is expected from them that as soon as practicable by their own labour they may refund in cash, or kind to their husbands, the dowry paid to parents on marriage. Such dowry generally consists of 100 sheep and 40 tillas, which the bridegroom either pays down in a lump sum to the parents of the bride or by stipulated instalments.

Before a wedding it is customary for the bridegroom, after having arranged for the dowry to be paid to the parents of the bride, to collect his friends for a succession of horse races and other sports, as also to secure and decorate a camel with the handsomest trappings, which is sent to the bride's kikitka, and on which she mounts and goes forth to receive the congratulations of her own relations.

On the appointed day of the wedding the bride seats herself on a carpet outside her tent, surrounded by her own people, and the female relations of the bridegroom go down to receive and take her away. This is immediately resisted by the young ladies' party, who offer resistance by the discharge of raw eggs, &c., at the assistants, on which a general egg fight is entered into by the young women present, whilst the older dames carry on the engagement with almonds and raisins.

In the meantime the bridegroom rushes into the *mêlée*, walks off his beloved, and puts her upon the *kajour* or camel-saddle, when the matter is concluded.

Another sort of marriage called *gulcha*, where the girl of her own accord runs off with the young man, without reference to parents, is

accepted as all correct, provided he is of a like social position and duly pays up the prescribed dowry.

On the 26th of January last, Captains Maitland and Yate left Bala Murghab to report on the country between the Murghab and Heri-rud rivers along the Gumbezli route, hitherto unexplored. I cannot do better than give Captain Maitland's description of this portion of Badghis in his own words. He says:—

"The hitherto little-known tract lying between the Murghab river, with its affluent the Kushk-rud on the east and the Heri-rud or Tejend on the west, has a breadth of about 90 miles between Ak-tepeh and Pul-i-Khatun, which are nearly in the same latitude. It may be generally described as a great expanse of undulating and broken ground, rising into gently sloping heights and high plateaux to the south, and subsiding into nearly level plains to the north-west.

"The term 'Chol' is applied to the greater portion of it by the Turkomans. This is an Arabic word signifying a desert, and is commonly used in Afghanistan and Beluchistan as synonymous, or nearly, so with 'registan.'

"The 'Chol' of the Turkomans is not, however, by any means a sand desert, for which they have another word, *chagah*. Its soil is very light and sandy, such as is termed in the Usbek dialect *kum*, a word which has been hitherto translated by European travellers as sand. For instance, we have always understood that the 'Kizil Kum' and 'Kara Kum' meant respectively, the red sand desert and the black sand desert. It would now seem probable that these tracts are not sand deserts, but resemble the Turkoman 'Chol.' The Saryk word for the light sandy soil of the latter is not *kum*, but *kirach*.

"There are, it seems, real sands between the 'Chol' and the Merv oasis, but nothing of the sort was met with in the country between Ak-tepeh and Garmāb. The term 'Chol' is applied to the tracts east of the Murghab, as well as to those on the west, and in fact to all country of a similar description.

"The border of the 'Chol' towards Penjdeh, where we entered it, is so sandy as to be little removed from actual sand; but after a mile or two the soil becomes firmer, and does not alter much until the Tejend is approached. The country is a mass—it might almost be said a labyrinth—of low ridges, hillocks, undulations, and hollows, and without the faintest trace of a drainage channel anywhere. In this it resembles a real sand desert, and the light porous soil absorbs all the rain and snow which falls on it as quickly as if it were actual sand.

"Various distinctly marked and well-known routes lead through the 'Chol,' both from east to west and from north to south. Although the country appears so open at the first glance, these tracks are by no means straight. On the contrary, they wind surprisingly, to avoid patches of sandy broken ground, which are of frequent appearance. The whole

of the ground is sufficiently soft to cause travellers, whether on foot or horseback, to prefer a beaten track wherever such is available, but a much more serious obstacle to moving off the road is the enormous number of holes made by sand-rats, marmots, and foxes, which literally honeycomb the ground, so that it is frequently impossible for a horse to go even a few yards from the path without putting his foot into one of them. To ride straight over the country at any rate of speed is more troublesome and fatiguing than to keep to the more circuitous but broader tracks, and to gallop is almost dangerous. For this reason even the alamans of the Saryks and Tekke kept as much as possible to the regular paths. These are not numerous in the eastern half of the country, but as the Tejend is neared they become more frequent, until about Kaiun-Kui-usi, Adam Ulan, Kungrueli, &c., tracks may be found leading in almost every direction. Many of them, however, are already getting very old and faint.

"The light soil of the Chol is by no means wanting in fertility of a kind. It is not strong enough to bear crops, which would at once be parched up by the sun when the spring rains were at an end. But short grass appears to grow on it almost everywhere. When we passed through the country the grass was but just springing; however there is sheep grazing of one kind or another right through the winter. The grass in the chol itself soon withers after the dry season has set in, but the *tirkha* (wild thyme, or southernwood) lasts much longer. In parts there is a good deal of what may be termed thin jungle of *kundum* and other bushes, among which the *barjak*, resembling broom, is conspicuous. We saw very few bushes of any sort until the neighbourhood of Gumbezli Saryk was reached. About here the country changed its aspect to some extent. Considerable tracts from Gumbezli westwards are pretty thickly covered with bushes, *kundum* being always the most common, while low *tirkha* scrub is very general. On the other hand there seems to be less grass, and as usual where the latter is best, not a bush, however small, can be seen. Generally it may be taken for granted, that the sandier the soil the more bushes and less grass will be found growing on it. This applies to the Chol generally. There are some tracts near the Murghab where there is a good deal of wood in the shape of *kundum*, &c. The *assafœtida* plant, called by the Turkomans *purs kamak*, is abundant in many places, growing most thickly in the sounder grassy ground. The people of the country seem unaware of its value.

"Not unfrequently the country rises into elevations which may be dignified by the name of hills, that is to say they rise from 400 to 700 feet above the general level of the Chol; their slopes are invariably very gentle, and their summits nearly flat. Some of these elevations are well known by name, probably the shepherds have names for all of them. Among those we saw are the following:—

"Birwat Guzlan, about 12 miles west of the Murghab and north of our road. It is from this hill, or hills, for there is said to be group of three, that the people of Penjdeh obtain their supply of wood. Geok Chelar, a ridge 24 to 30 miles from the Murghab and not far from our route. Khan Kiri, the Khan's hill, the khan being a leader of shepherds, so styled. Kaik Kiri, "deer hill," part of the same range as Khan Kiri. The hill of Kaiun-Kui-usi, which is a fairly good landmark, 600 feet high. North-west of it are hills known as Karau-ung-Kiri, "the hills of the black visaged one"; the road to Sarakhs passes by these hills. North-west of Kaiun-Kui-usi is a hill called Taoghar, a word said to signify a peak. There is an old well near its foot, and it is a good landmark. There are other small hills to the north and north-east of those mentioned, but looking from the top of the hill near Gumbezli Taka, the country to the north and west appears to be an almost open plain, with no hills except a line of low heights in the neighbourhood of the river; but there is doubtless a good deal of broken ground not distinguishable from a distance.

"A long ridge runs south of the road by which we travelled and parallel to it. It commences near the river, where it is known as the Baganj Kiri, and extends westward to the neighbourhood of Tátung Ori. Without entering into the details of wells and halting-places on this Gumbezli route it may be well to note this Tátung Ori as one of the most interesting points on it.

"At a spot as nearly as possible 40 miles from Ak Tepeh, a few bricks were lying about, and the neighbourhood bore traces of cultivation, whilst at about two miles further on was Tátung Ori or Or Mahomed Amin. Or is Turki for a ditch or intrenchment: Tátung Ori is "the intrenchment of the Tátar." The Tátar alluded to is Mahomed Amin, Khan of Khiva, who made a great foray on Penjdeh and the tribes on the Oxus some thirty years ago.

"One of the guides, Anak Sirdar, was with Mahomed Amin's force. He states it consisted of 10,000 horsemen, and the same number of others, principally camel-drivers. Every two horsemen were provided with a camel-load of water and a camel-load of grain, so there must have been at least 10,000 camels. They took no "bhusa," the horses living on their grain rations and what they could pick up. As it was the month of February there could have been only the smallest amount of grass just springing up, and wormwood scrub then dry and withered. On the other hand patches of snow, as now, removed all anxiety on the score of water. The expedition was five days in moving from the neighbourhood of Sarakhs to the spot with which Mahomed Amin Khan's name is now associated, and five days more to Pul-i-Khishti, near which is an intrenchment similar to that of Tátung Ori. It is said to have been the custom of the Khivans, like the Romans of old, to intrench their encampments every night. The slowness of the march was intentional, as

it was the Khan's object to sweep off the flocks of the Tekke, who at that time occupied the Sarakhs district and had permanent camps at Gumbezli and the two Kiris. The Saryks had not then been dispossessed of Merv, and were nominally subjects of Khiva. About one hundred of them served with the expedition, which was principally composed of Khivan Turkomans. There were also a considerable number of Jamshidis, it being the time when that tribe were refugees at Khiva.

"The slopes of Baganj Kiri range, if it can be so called, are extremely gentle. It throws out ill-defined projections or spurs to the northward, which are crossed by the road. One of the last of these, 33 miles from Ak Tepeh, was the highest point on the route between the Murghab and the Tejend, and from it a view is obtained of the hills in the neighbourhood of Pul-i-Khatun, including those on the Persian side of the river. Its elevation is about 900 feet above our camp at Ak Tepeh, and therefore about 1450 feet above sea-level.

"To the south of this ridge is open country, extending some half-dozen miles or more to the spurs and lower slopes of another and much more important ridge or line of heights which stretches almost all across the space between the rivers, and may be considered, topographically, as a continuation of the Kara Dagh Mountains which extend to Pul-i-Khatun. In old maps a range of hills is depicted running eastward from that place. In most of the later compilations these have disappeared, but they nevertheless exist in the modified form above mentioned. From Pul-i-Khatun they incline south-east, presenting a scarped face towards the river. The scarp is continued southwards, and is the high cliff which incloses the valley of the Heri-rud, or Tejend, on the right bank of that river. The slope from the top of this cliff towards the interior of the country is extremely gentle, but at its northern end a fairly well defined ridge runs eastward, and bounds the Adam Ulan valley on the south.

"This range is known as the Askhar Lilang Dagh. It terminates in high ground, which appears to turn abruptly south. At all events the watershed is crossed between Agár-i-Chashma and Kungrueli at only a few miles from the latter. From this point northwards to Adam Ulan and the plain south of Kaiun-Kui-usi, the country is a mass of broken grassy ridges and undulations divided by small but beautiful valleys. Near the watershed, outcrops of rocks are sufficiently frequent to diversify the country and add to its charm, and the hills are in many places covered with pistachio trees. It seems strange there should not be more surface water in this country. Agár-i-Chashma is the only spring any of the guides knew of, and that is very small. But rock and gravel are so near the surface in most places, especially as the watershed is approached, that water could doubtless be obtained in some of the ravines by digging a few feet.

"From north of Kungrueli the watershed apparently bends north-

east, and then turning eastward passes south of Elibir, and so along the hills until these terminate some eight to twelve miles short of the Kushk-rud, at or near a place called Kagazli. I gather from Captain Yate that about Elibir there are valleys similar to those in the neighbourhood of Agár-i-Chashma, but it is probable that further east the north slopes of the hills are similar to those of the ridge south of the Ak Tepeh-Kaiun-Kui-usi road.

"No general name could be got for the hills, but when we obtained our first glimpses of them, on our second day's march from Ak Tepeh, I was informed they were known as the Duzang Kiri, that is the "hills of the salt," from the salt-beds of Yar-oilan, which lie to their south.

"On the south side of the hills is a great plateau, 10 or 12 miles wide, and little, if at all, inferior in height to the hills themselves, which may be considered the northern slope of this tableland. The exact topography of the country is still doubtful, although we can now speak with confidence as to its main features. However, there is a distinct dip from the summit line of the Duzang Kiri, and then a gentle rise to the top of the plateau. It is in this hollow that the second wells passed by Captain Yate are situated, and it appears to drain eastward. The plateau itself is a beautifully grassed table-land, about 2000 feet high, that is, 700 to 1000 feet higher than the country to the north, and 1300 to 1400 feet above the salt lakes of Yar-oilan.

"Very few birds or animals were seen in the "Chol." Of the former, ravens and a few small birds alone presented themselves, until we approached the Heri-rud, when a few sand-grouse and large flights of ruddy sheldrake and geese passed overhead daily. Deer are said to be numerous, together with the goorkhur, or wild donkey, of which there was a herd of over 100 in the Adam Ulan valley. Both deer and wild asses, particularly the former, are regularly hunted by the Turkomans for the sake of their flesh and skins. Many foxes are also trapped every year; wild pigs are common in the Chol; the only other animal we came across was a porcupine."

There is no more interesting natural feature in this part of the world than the Nimaksar, or salt lakes of Yar-oilan, visited and described as follows by Captain Yate:—

"Yar-oilan means 'the sunken ground,' and no word can better describe the general appearance of the valley of these lakes. The country around consists of undulating downs, the height of the road over the last ridge immediately to the north of the valley being some 2550 feet, and over the Band-i-Duzang, on the ridge forming the eastern end of the valley, some 2570 feet above sea-level. The crest of the plateau at the commencement of the descent into the valley is about 2390 feet.

"The total length of the valley from the Kungrueli road on the west to the Band-i-Duzang which bounds it on the east, is about 30 miles, and its greatest breadth about 11 miles, divided into two parts by a connecting

ridge which runs across from north to south, with an average height of about 1800 feet, but has a narrow hill, which rises to some 400 feet above the general average.

"To the west of this ridge lies the lake from which the Tekke Turkomans from Merv get their salt. The valley of this lake is some six miles square, and is surrounded on all sides by a steep, almost precipitous descent, impassable for baggage animals, so far as I am aware, except by the Merv road in the north-east corner. The level of the lake I made to be about 1430 feet above sea-level, which gives it a descent of some 400 feet from the level of the connecting ridge, and of some 950 feet below the general plateau above. The lake itself lies in the centre of the basin above described, and the supply of salt in it is apparently unlimited. The bed of the lake is one solid mass of hard salt, perfectly level, and covered by only an inch or two of water. To ride over it was like riding over ice or cement: the bottom was covered with a slight sediment, but when that was scraped away the pure white salt shone out below. How deep this deposit may be it is impossible to say, for no one has yet got to the bottom of it.

"To the east of the dividing ridge is the second lake, from which the Saryks of Penjdeh take their salt. The valley in which this lake is situated is much the larger of the two—without noticing the sloping downs at the eastern end, the valley proper is itself some 15 miles in length by about 10 miles in breadth. The descent to it is precipitous on the north and west sides only, the eastern and south-eastern end sloping gradually up in a succession of undulations. The level of this lake is apparently lower than that of the other; I made it out to be some 800 feet above sea-level. The salt in this lake is not so smooth as in the other, and did not look so pure. It is dug out in flakes or strata, generally of some four inches in thickness, is loaded into bags, and carried off on camels for sale without further preparation. The Saryks of Yulatan, too, seem still to take their salt from this second lake, as I heard on my arrival of a party of them having just left.

"A large party of Tekke from Merv had been down for salt ten days or a fortnight before.

"The road from Yulatan to the salt lakes, which the Saryks use, runs for three marches up the banks of the Murghab to Aigri Tapi, thence four marches across the desert without water to Gumbezli (Saryk), from which place it joins into the Merv road at Elibir, though there is also an old track which runs direct to the road on the crest of the plateau just before the commencement of the desert.

"Some 200 yards above the point where the road to the western lake turns off to the right, the road to the eastern lake turns off to the left, and winds down into the valley below, and round the southern edge of the lake to the camping ground, which is on a sandy mound to the south-east.

"Elsewhere, with the exception of one spot on the northern side, the

banks of the lake are too soft and muddy to permit of near approach. Curiously enough, I found the shore of the lake at this camping place strewn with fossil cockle and oyster shells, and bits of flint.

"The road from Penjdeh is another well-worn track—six ordinary marches, with little or no water.

"The Penjdeh salt is usually carried during the three autumn months. In the early spring the male population are busy sowing. During the summer the desert-fly, whose bite is fatal to camels, is on the wing, and all camels are kept in the oasis of Penjdeh, they being only taken out to graze in the cool hours. As soon as the crops have been reaped and the men are at leisure, trade commences and is carried on till winter sets in. Salt, I am told, sells in the Penjdeh bazaar at the average rate of 20 lbs. for 10d.

"The old Nimak-sar and Maruchak road runs off from the Penjdeh road at the top of the ascent at Duzang Japithi, and though now quite unused, its course can be traced across the downs in an easterly direction towards Kala-i-Maur. Another road runs off from the banks of the lake in a south-easterly direction to Islim; it is also a well-worn road, as by it all the salt is taken to supply the Hazaras at Kala Nau, and the Jamshidis at Kushk. It appears these two tribes do not carry their own salt, but are supplied by the Saryks of Penjdeh. Salt fetches at Kala Nau and Kushk double the price it does in Penjdeh. The Salors from Sarakhs take their salt from the western lake. One other important road from the Nimak-sar remains to be noted, namely, the one running southwards to Ak Robat, 13 or 14 miles distant. The salt at Nimak-sar is entirely untaxed. The lakes are looked upon as a provision of nature, free to all, and anybody may go and dig as much as he pleases. The same rule prevails, I am told, with reference to the salt-mines near Herat; and no taxes on salt, I believe, are anywhere levied by the Herat Government. In past years both the Tekke and the Saryks only came for salt in large well-armed parties, and no one else, I fancy, dared to come at all. Each party was afraid of the other, and by tacit agreement each did its best to avoid the other, neither side ever crossing the dividing ridge between the two lakes or attempting to interfere with the other."

All the tract along the foot of the Koh-i-Baba, which in November was bleak and desolate, in spring burst out into a garden of crocuses, hyacinths, tulips, and every species of bulbous plant indigenous to that sandy soil, mingled with an endless variety of flowers and grasses. Our enthusiastic botanist Dr. Aitchison was in the seventh heaven, as he gloated over the product of a ten days' expedition, and the hundred new species added to the list of plants. But then comes the question, Had any explorer, the Russian Regel or other, been before him, and would futurity accept this or that specimen as Aitchisoniana or Regelian, or some other iana?

I have made the endeavour in the short time at our disposal, by the aid of copious extracts to draw your attention to the main general features of the country which forms the subject of my lecture, and to the salient characteristics of the people inhabiting those countries. I have touched on the principal drainage system and the one great and important natural feature, namely, the salt lakes. From what I have said, you will no doubt have gathered that the country is one capable of great resources. The climate is good, the winter is cold, and great storms are not unfrequent during the winter months, indeed we experienced one as late as the 2nd of April; the spring and autumn, however, are beautiful; and the summer, though hot, is nothing to the extremes of heat to which we are accustomed in the plains of India. With a settled government and increased population, there is no reason why this should not become one of the most prosperous tracts of Central Asia.

I would like to conclude with some incidents illustrative of the Turkomans. Having had no mercantile transactions except with Jews, they are rather difficult gentlemen to deal with, and very avaricious. On one occasion, when some forty of them attended a Durbar at Bala Murghab and were all offered tea and Huntley and Palmer's sweet biscuits, they partook of the same with becoming gravity; the elders, in prominent places and very much on their best behaviour, helped themselves sparingly, whilst the gentlemen in the corners and out of sight did as a sailor would express it, "clear the decks," their leader "Aman Geldi," invoking a blessing on the repast before they commenced, and a thanksgiving afterwards; but scarcely was the latter concluded, when with a somewhat knowing look of his wicked old eye, he inquired what was to be done with the biscuits still remaining on the plates. I of course remarked that they were at their disposal. The words were hardly out of my lips when the whole august assembly were on the floor scrambling for the victuals.

It may interest some here to know that whilst at Penjdeh in December, a venerable old Moolla of the name of Rahman Mahdi, a son of the late Khalifah of Merv, and himself the Khalifah of Penjdeh, brought me testimonials given to him in Herat by Dr. J. S. Login, and a certificate signed Joseph Wolff, the well-known Bokhara traveller, dated 14th of April, 1844, saying that the said "Rahman Mahdi" had been very kind to him.

I must not, however, leave you with the impression that the Turkoman is altogether the innocent peasant he on first acquaintance appears to be.

I can never forget that look of utter contempt with which a Sirdar (the title accorded to every successful leader of an alaman) eyed me on one occasion when I was attempting to impress on the elders of his tribe the necessity for settling down to peaceful avocations.

I believe in their hearts these Turkomans entirely share the feelings of a grand old border soldier, Kurban Ali Beg Mervi, who with fifty Turkoman horsemen formed my escort on the way to Meshed, and who along with the free lances of Timouri, Hazara, and Khorassani, had, in troubled times, for many a day kept watch and ward on the Persian side of the border.

Kurban Ali Beg had accompanied many a successful foray on Penjdeh, and fallen on many a wearied Tekke and Saryk when returning homewards loaded with plunder.

I picture him to myself now as I used to see him on the early march, as light came creeping upon the Eastern sky, pointing down in the valley to corners where he had once smitten the Tekke, and the passes by which different bodies of horse emerged and joined to the number of some hundreds to intercept Turkomans on their homeward journey—how they recovered from them, captives, men and women, besides flocks, horses, &c., and left so many of their bodies on the plain.

“Those were days,” said old Kurban; “I was then a poor man, but on one day twenty-three horses came to my share, and after twelve years of constant care, without a night in bed, by the blessing of Providence I acquired flocks of sheep, and thirty Bokhara camels, and the means to maintain a bunch of horsemen at my back.

“Now, all that has changed; bad times have come, alamans have ceased; never again will I feel that excitement which no one can express, of listening to the tread of the Tekke horse as wearied and tired they pushed along in the valley below, and the certainty that those exhausted men and steeds would have to make a struggle for existence or remain captive in your hands; and when the strife was over and the Tekke fled or captured, to listen to the joyful exclamations of the released captives, and their asseverations that so long as life should remain you should ever be accepted as the most welcome of guests.

“Sons of burnt fathers! had you occasion ever to return there, they would know you not, or take care not to be at home when you might have to seek their hospitality.”

Previous to the paper,

The PRESIDENT said the Royal Geographical Society had now the pleasure and the honour of welcoming one of its oldest members, namely, Sir Peter Lumsden, who, having just returned from Central Asia, where he had prosecuted very important geographical researches, had, like the good soldier that he was, obeyed the orders of the officers of the Geographical Society, and kindly consented to read a paper upon the country to the north of Herat, and the Koh-i-Baba range. No further words were needed in introducing him to the meeting.

After the paper,

Sir HENRY RAWLINSON said he appeared before the meeting in deference to the bidding of the President, but he did so with some apprehension, as he was afraid that the remarks he might have the honour of offering would appear some-

what incongruous after the interesting narrative to which they had listened. He had never visited the country described by Sir Peter Lumsden, and was therefore unable to afford any additional information with regard to its physical condition, while the political questions involved in the dependency of the region in question, to which he had paid some attention, were according to the rules of the Society tabooed, with certain reservations. He therefore could only make a few remarks on the ancient geography and history of the country. It was not as lively a subject as that to which the meeting had just listened; still it was of some importance and almost necessary to a due understanding of the country. He believed there was a good deal of misapprehension abroad with regard to the general subject of the Merv frontier. Many persons were hardly aware that there were in antiquity two distinct cities of the name of Merv, one 140 miles from the other. He had, however, written out his remarks in order that they might not appear unnecessarily desultory, and he would therefore, with the permission of the meeting, read the following notes.

There were two cities known by the name of Merv. The greater Merv, which now forms the Russian capital in Trans-Caspia, was a city dating from pre-historic times. In conjunction with Balkh and Herat it had formed the tripolis of primitive Aryan civilisation, the three cities being mentioned in the *Vendidad*, which is the Genesis of the Parsees, among the earliest creations of Ormazd. In Persian romance, the citadel of Merv was supposed to have been built by Tahmurath, one of the earliest kings, and a building is said to have survived in the city up to the time of the Arab conquest, which was called Kai Marzaban, and was of so stupendous a character as to be regarded as a talisman. It is very doubtful if Alexander ever visited Merv. He certainly left the city far to the east on his march from Khorassan to Herat after the murder of Darius, and his asserted return to Merv from Samarcand before proceeding to India rests on insufficient authority. There was, no doubt, a tradition of his having founded a city on the Margus which he called Alexandria, and which, being destroyed by the Nomades, was subsequently rebuilt by Antiochus Soter, under the name of Antiocheia; but it is more probable that the latter was really the only Greek restoration. As to the derivation of the name, which applied equally to the river, the country, and the city, there is some uncertainty. Bournouf compared the Sanscrit Maru, "a desert," whence Marwar, and referred the name to the notoriously barren steppes surrounding the oasis; but I would myself rather compare the old Persian *Marj* or *Marz*, "a limit," as the Margus was in very early times the Aryan limit to the west. In the inscriptions of Darius, the satrapy of Margush is often mentioned, which the Greeks rendered by Margus applied to the river and Margiana to the district. The modern *v* represents the old *g*, according to the laws of euphonic change; but in the ethnic title Marúzi, "a Mervian," we trace the form through Marz and Marj to the original Marg.

The first important historical event we know of in connection with Merv is the fact of Orodes, the Parthian king, having transported to this remote locality the Roman soldiers whom he had taken prisoners in his victory over Crassus. They were 10,000 in number, and seem to have formed a flourishing colony which exercised a powerful influence on the civilisation of the surrounding region. It is true that Mr. E. Thomas, who first drew attention to the subject and who thus explained the Roman character of the Indo-Scythic coins of the period, confounded the two Mervs, and placed the foreign colony in the southern rather than the northern capital; but this confusion of sites was after all of no great historic importance. About 200 years after Christ, Christianity is believed to have been introduced into Merv by Bereshiya, a Syrian priest, the day of whose arrival was accordingly long kept among the festivals of the Eastern Church; and Christian congregations, both Jacobite and Nestorian,

flourished at Merv through all subsequent history. It is asserted indeed by Ibn Athir, that when the last Sassanian king Yezdijerd was slain, in A.D. 651, by the miller of Zerk, a village on the Rezik canal outside Merv, the Christian Mitran (or Metropolitan) obtained leave to perform his obsequies out of gratitude for the many benefits conferred on his co-religionists in Persia by the monarchs of that dynasty. Since the Arab invasion of Persia, Merv has gone through many vicissitudes. Lying in the direct track of the Turkish nomades who burst into Khorassan in the early centuries of Islam, it was repeatedly devastated; but owing to the natural fertility of the soil and the abundant means of irrigation furnished by the Murgháb it soon recovered from each successive ruin, and under the Seljukian kings, Alp Arslan, Sultan Sanjar, and Malek Shah, it became the capital of the Persian empire. The later history of Merv, from the time of Chenghiz Khan to the present day, is too well known to require any detailed notice. The site of the fortress has been repeatedly changed, and it is understood that the Russians are now laying out a new city to be fortified according to the rules of modern engineering science, and which may be expected in the near future to become one of the most important positions in Central Asia. The Governor of Merv is said before Islam to have had the title of Mahavieh, which I cannot explain, but which was probably derived from the Hiyátheleh, who at that epoch exercised supreme control. Another title was Khodá Kushán, supposed to mean "the king killer," from the murder of Yezdijerd, but more probably signifying merely "king of the Kushán or Tokhari."

The smaller Merv, which is sometimes called Merv-el-'Álá, or "the Upper Merv," from its position higher up the river, or more generally Merv-er-Rúd, "Merv of the river," was about 140 miles south of the greater capital. The city is said to have been founded by Kesra Anushirwán in the fifth century of Christ, who sent architects from Babylonia for the purpose, and at the time of the Arab invasion, a century and a half later, it was certainly a flourishing place. At that time the whole of the region on the Upper Oxus and as far west as Nishapúr was held by the Hiyátheleh or White Huns, whose capital was at Talikán, near the junction of the Kaisar river with the Murgháb.* These Hiyátheleh were not Turks, but Scytho-Aryans, of the same race indeed as the ancient Sacæ, and were named indifferently Tokhari and Kushán. They spread into Persia from Badghis in the early ages of Islam, being noted for their barbarous dialect, whilst sojourning in Kohistán and south-western Khorassan, and were finally absorbed in the mass of the Persian population.

A question has arisen of some geographical interest, as to the identification of the site of this city of Merv-er-Rúd. In Major Holdich's paper which was read before the Geographical Society some months ago, it was said that Sir Peter Lumsden's officers had fixed on Bala Murgháb, where the General passed the winter, as the modern representative of Merv-er-Rúd. I was inclined myself, at an early stage of my inquiries into the subject, to identify the old capital with Ak-Tepéh, both from the appearance of the ruins and because Ak-Tepéh suited the indication of being in the direct line between the greater Merv and Herat; but further research has satisfied me that Merv-er-Rúd must really have been either on the site, or in the immediate vicinity, of Meruchak (Maruchak), the highroad from Herat having made a detour to the east in order to pass through this city. Of the arguments which prove this identifi-

* The kings of Merv-er-Rúd before Islam are said to have been termed *Gilán*, in reference, I presume, to the royal tribe of the White Huns. Is not this then the explanation of the epithet Gileki, attached to Tabas, one of the Hiyátheleh settlements in Persia, and was not the name inherited from the Ægli, whom Herodotus associated with the Bactrians?

cation I will only mention a few. (a) Merv-er-Rúd was certainly on the Murgháb, a few miles higher up than Penjdeh; the villages along the river between the two sites, which were nine in number, being assigned by the geographers as dependencies sometimes of one town and sometimes of the other.* (b) The recorded distances to Merv-er-Rúd, both from old Merv and from Herat, will alone suit Meruchak; 37 farsakhs, or 111 miles, being assigned to the former interval, and 47 farsakhs, or 141 miles, to the latter, which are the true measurements. (c) The most important argument, however, is the following. Up to the reign of the Amir Timúr, at the end of the fourteenth century of Christ, Merv-er-Rúd is the only great city named in history on the Upper Murgháb above Penjdeh; but immediately after that date, that is in the reign of Timúr's son, Shah Rokh, the name of Merv-er-Rúd disappears and Meruchak takes its place in all the geographical notices of the region, the inference being that either there was a direct change of name at that period, or that Merv-er-Rúd having been destroyed in Timúr's wars, the new city of Meruchak was built by his successor in its immediate neighbourhood.† (d) The cross route also given by Hamdullah Mustowfí from Sarakhs to Balkh confirms, I think, the identification of Merv-er-Rúd with Meruchak; for after crossing the desert from the Heri-Rúd to the Murgháb, a distance of 30 farsakhs, estimated by Captain Maitland at 90 miles, the road continues from Dizéh, adjoining Penjdeh, 15 miles up the river to Merv-er-Rúd, and then strikes into the *Chol* or desert, eastward along the route recently followed by Captain Peacock in his excursion to the Oxus.

Before quitting the subject of Meruchak, which is probably a mere diminutive, signifying the lesser Merv, it may be interesting to note that the position is one of much strategical importance, owing to its close proximity to the mouth of the valley through which the Kaisar river debouches on the Murgháb, and along which is the only convenient route leading from Herat to Afghan Turkistán. The importance of this route was shown in antiquity by the Hiyátheleh placing their capital of Talikán in the middle of the valley, near the modern position of Kileh Walí, and it need not therefore surprise us that Russia is now making strenuous endeavours to attach Meruchak to Penjdeh so as to include it in the territory of the greater Merv. Between Meruchak and Penjdeh must also be noticed the Dizéh or Dizéh-Rud of the geographers. This was an important town bisected by the Murgháb, the two divisions being connected by a bridge of which the ruins are still to be seen.‡ I cannot determine the exact heap of mounds which marks the site either of the Upper or the Lower Dizéh, as the old names are locally lost. According to the account of Captain de Laessó, which I hold in my hand, both banks of the river from Ak-Tepeh to near Meruchak are studded with ruins, which must represent the various towns noticed by the geographers, including Kasr-i-Ahnef, built by one of the Arabian generals § at the time of

* The names of these villages were Behvánh, Khuzán—probably at Ak-Tepeh, Lower Dizék, Upper Dizék (modern Dishek), Fulghár, Marast, Aighán, Madúveh, Zaghúl—the famous Mohallib Ibn Sufrá buried here. In the time of the great Timúr Bey (A.H. 784) Penjdeh is said to have been called *Yendi*, which is a name that I cannot explain. See *Hist. de Timúr*, vol. i. p. 359.

† Merv-er-Rúd is constantly mentioned in the wars of Timúr, in the notice of his marches from the Oxus to Herat, and in one passage (*Hist. de Timúr Bey*, tom. i. p. 317) the phrase occurs—"Merv-er-rúd, appelé ordinairement Morgháb." This refers to A.H. 782; but in A.H. 820, Hafiz Abrú says that the district called Morgháb contained three cities, Pul-i-Taban (Derbend), Meruchak, and Penjdeh.

‡ The older form was *Dizek*, "the little fort." There was here a bridge across the Murgháb from the earliest times, which bridge was apparently twice repaired by Timúr in A.H. 782 and 785. See *Hist. de Timúr*, vol. i. pp. 315 and 365.

§ The town built by Ahnef was about 12 miles from Khuzán (or Ak-Tepeh) and 15

the first invasion of the Mahommedans, and the five, or rather nine, villages composing at different times the township of Penjeh. Ak-Tepeh was, I think, Khuzán,* and the name of Dizheh or Dizheh-Rúd, as it was often called, is probably preserved in the title of Dishek, which now applies to some excavated cliffs in the neighbourhood. These cliffs, which are honeycombed with caves, inhabited at one time by Buddhist ascetics, are very interesting, and have been minutely described in a paper by Captain de Laessö, which I hold in my hand, and which may be published in the 'Proceedings' of the Society, but is too long to be read to the meeting. Similar excavations have been examined in other parts of the mountains, and indeed may be said to be the chief object of interest in every river valley extending from Bamiyán to Herat, but especially in the valleys of the Helmund, the Heri-Rud, the Arghendáb, and the Murgháb. The majority of the caves in question probably date from the first century of Christ, when the great immigration took place of the Indo-Scythic tribes, who were all zealous Buddhists; but it is possible that some of the excavations may be still older; for there were Sacæ in the mountains as early as the time of Darius, and the Chinese pilgrims refer to monuments at Balkh which dated from Kasyapa, who was the Buddha preceding Sakya Múni.

I wish now to offer a few observations with regard to the nomenclature of the country which Sir Peter Leumden has described. He very properly applies to each chain or part of a chain the name by which it is known in the country, but this is not the usual practice. The hills, for instance, which bound the district of Badgheis to the south, and which Russia thinks would be her most convenient frontier, are commonly called the Paropamisus; but this is a complete misnomer. The Paropamisus, as known to the Greek geographers, extended no further westward than Herat, the continuation of the chain being termed Sariphi, equal to the Zend Erezifya and Persian Arsif.† Paropamisus is in the inscriptions of Darius, Paru-Paraesin, "the mountain of Parsin," which was the local name of the great range, the modern Sufid Koh, up to the time of the Arab conquest.‡

Another interesting illustration refers to the Tejend river. This name of Tejend is a mere hardening of the original, "Zend" or "Zendik," which is the name applied to the lower part of the Heri-Rúd in the Bundelesh, and which is at least as old as the time of Tacitus, who tells us that the Sinde divides the Arians and the Dahæ, "determinat Arios Dahæ," that is, is the boundary between the Arians of Badgheis and the Dahæ of the Akhal steppes. And there is a further explanation afforded by the name, which solves a puzzle that has long perplexed Oriental scholars. It is well known that when Manichæism was expelled from Persia by the Sassanian kings, the heresy took refuge in Central Asia, where it flourished among the nomadic tribes, and especially among the Taghazghuz, who formed the advance wave of the approaching Turkish immigration. These Taghazghuz soon after the

from Merv-er-rud (or Maruchak), and must have been situated, therefore, a few miles east of Bend-i-Nadir, where the desert road to Balkh entered the hills. Before the Arab invasion the Persians had a fort on the spot called *Sinucán*.

* Ak-Tepeh must have been a place of great importance in antiquity, though it did not survive to Arab times. I conjecture it to represent the Candake of Isidore between Merv and Herat, the name alluding probably to the trench or *khandak* which stretched from the Kushk to the Murgháb and formed its southern defence.

† The name of *Arsif* was applied by the Persians to Bamiyan, but did not extend further to the west.

‡ The Bundelesh would seem to indicate that the Persian race came originally from this region, but such a derivation is not supported by any Zend authority. The name of Parsin was still in use at the time of the visit of the Chinese pilgrims, but does not appear in any of the Arab geographers.

Arab conquest crossed the desert and settled at Sarakhs and along the course of the Tejend, where they formed the dominant tribe for several centuries; hence then, probably, arose the name of Zendik, which is applied to the Manichæans in general, by the early Arabs (Ibn Khurdadbeh, the postmaster of Khorassan, and his followers), and also in the contemporary Pehlevi tracts, and which has hitherto not been satisfactorily explained. There was also a large village on the river near Sarakhs, which retained the name of Zendikan from these sectaries as late as the time of Yacût. The Manichæans of Sarakhs in the ninth century infected Magism, and almost caused a schism among the followers of Zoroaster.*

And it may here be noted that the borderland of Eastern Khorassan was a very hotbed of heresy during the early ages of Islam, almost all the impostors who distracted the Mahomedan world from the eighth to the tenth and eleventh centuries having issued from this region. And I may especially notice Mokanna,† the hero of Moore's poem of the "Veiled Prophet of Khorassan," who was a native either of Merv or of Badgheis, though he afterwards migrated across the Oxus, and was finally besieged and slain in the fortress of Sinâm near "the Iron Gates," south of Shahar-i-Sabz. It may be remembered too that as late as the time of Marco Polo the Malâhideh heretics, better known as Ismaëlis or Assassins, held possession of a great part of Khorassan, and set at naught the power of the Mongol sovereigns.

M. LESSAR, addressing the meeting in French, said :—Circumstances caused him to be the first explorer of the country between the Heri-rud and the Murghab. He was very happy to have this occasion to express the sentiment of gratification for the encouragement which he received from the kind reception accorded by the Royal Geographical Society to his travels. But these travels were simple reconnaissances, and the country remained very little known. It is easy to understand with what interest he received every news from the spot when last year the Commission of General Sir P. Lumsden began its work. Unfortunately the bringing together and realising of extensive, exact surveys and explorations always require much time. But from the little that is known as yet from the preliminary reports of the Commission and from correspondences in newspapers it is seen that very much has been done. The knowledge of the country derived from rapid reconnaissances is now replaced by that from exact and various study of it, and his (M. Lessar's) pride now is to be in a position to understand the value of the good work carried out by Sir P. Lumsden and the Commission of which he was the head, and express the great admiration of that work, prosecuted, as it has been, under such difficult circumstances.

The PRESIDENT, in asking Colonel Stewart to make a few observations, said that his services would be fresh in the recollection of the Society. Some years ago, in the guise of an Armenian horse-dealer, he traversed the frontiers of the Persian and Turkoman country and obtained most valuable information, which he communicated to the Society in a paper published, with a valuable map, in the 'Proceedings' for 1881.

Colonel C. E. STEWART said he came to the meeting quite unprepared to speak. He had accompanied Sir Peter Lumsden on a part of his journey, and he had also visited Badghis or the country between the Heri-rud and Murghab rivers some two years previously, in fact shortly after that country had been visited by M. Lessar. He then went over the very Chol described by Sir Peter Lumsden. The geography

* See 'Sacred Books of the East,' vol. xviii. p. 329.

† Mokanna's native place was *Kahriz* in Badgheis, according to the best authorities, but whether by this name is meant the town west of the Heri-Rud near Kohsan, or some other famous subterranean aqueduct of the period, it is impossible to say.

of the district had been so ably treated by Sir Peter Lumsden that he would not further refer to it, but would tell a few of his personal adventures to illustrate what the Turkomans were doing at that time. No sooner had he started from a Persian village near the frontier Afghan village of Kuhsan than he came on the tracks of a large alaman or raiding party. He had on several occasions joined the Persian troops in pursuing parties of raiding Turkomans. On this day he was most anxious to discover whether the Turkomans were hunting him or whether he was hunting the Turkomans. It was very doubtful whether they were in front of or behind him, for some time it appeared that some were in front and others behind. A bright look-out was kept, as the party with him was a very small one of seven men, while the tracks showed the presence of some thirty-five Turkoman robbers. Fortunately he discovered that the Turkomans had a number of captives and had gone on ahead. At another place between Kariz Elias and Agar Chasma his escort showed him where they had on a former journey had a fight, and pointed to some skulls on the ground and to a grave to prove their assertion. During his residence of some ten months at the village of Mohsinabad near the banks of the Heri-rud, some thirty-six people were carried off from that neighbourhood and sold into slavery by the Turkomans, some of these having been carried off so lately as the end of March 1884. On several occasions he was himself in considerable danger of being carried off. While with Sir Peter Lumsden, having a strong escort, there were none of these exciting scenes, and the whole party were better able to attend to geography than had been in his power in his ride through a considerable portion of Badghis in 1883.

The PRESIDENT, in moving a vote of thanks to Sir Peter Lumsden, said the meeting must have been interested in the manner in which he had shown that the advance of Russian civilisation had at all events wiped out the romance of Turkoman raids. It was to be hoped that in the future nothing would be used in combat of a more serious character than the egg fights that Sir Peter Lumsden had described. Sir Peter had vivified the dry bones of geographical discussion by relating the customs of the tribes, and by referring to the zoology of the country and the vestiges of ancient civilisation. They would all welcome him back with the greatest cordiality to the meetings of the Society and to the headquarters of "Big Maps."

Caves and Ruins at Penjdel. By Captain F. DE LAESSOE.

Communicated by Major-Gen. Sir H. C. RAWLINSON, K.C.B.*

Caves.—On the right bank of the Murghab the sandstone, which seems to form the base of the hills bordering the valley, frequently comes to the surface, and some former inhabitants of Penjdel have taken advantage of this to excavate a number of caves of different dimensions, but all excavated on the same principle and evidently for the purpose of habitation.

When I came to Penjdel in February last I had heard that caves were found there, and an old Sarik told me that as a boy he had crept through a hole leading to a very long passage, which he, however, was afraid of exploring. At my request he led me to the spot, a prominent hill called Yaki Deshik, situated on the right bank of the Murghab near

* This is the paper referred to by Sir Henry Rawlinson, in the discussion on Sir Peter Lumsden's address, *ante* pp. 580-1.

the point where the river leaves the foot of the hills and about four miles east of New Penjdeh. The slope of the hill is very steep, and at a height of about 200 feet the sandstone forms a perpendicular cliff 40 to 50 feet high. This cliff seems in former times to have been a good deal higher, but it has gradually crumbled away, and the lower portion now forms a very steep but not inaccessible slope covered with loose sand. Here, my guide said, was the entrance to the cave. But all search was in vain, no cave was to be found. Finally we discovered several hundred yards off a hole large enough for a man to creep through, and this gave access to a vaulted room about 30 feet long, half-full of sand, and somewhat damaged, but evidently excavated with considerable skill and care. My guide was, however, positive in his assertions that the cave he had seen when he was a boy was very much larger, and as I knew him to be a reliable man I offered a large reward to the neighbouring Bairaj tribe if they would turn out all their men and examine the hill thoroughly all along the foot of the cliff. After several days' work, during which a number of half-ruined caves were discovered, we finally hit on a room with a staircase leading down into the hill. This being cleared of sand and rubbish led us to a lower room which again gave access to a long passage almost filled with sand when we first reached it. The air was so bad that a candle would not burn, and the men could only work for a few minutes at a time, but the sand did not extend much beyond the place where we first entered the passage, and after a short time we had free access to a very remarkable cave. It was, however, necessary to defer the exploration for a few days till the air had been somewhat purified. Two days later it was still difficult to breathe in the cave and the candles burned so dimly that very little could be seen, but the Turkomans were willing to continue their work. The clear part of the passage was to the left of the place where we had effected our entrance; to the right all was full of sand, but walls and vault being intact it was clear the sand must have come from the outside and that we were near the real entrance of the cave. A passage was made through the sand, and when we had proceeded about 20 feet we came to the surface of the hill where the main entrance had formerly been, and this opening soon admitted air in sufficient quantity to make a prolonged exploration possible.

The annexed plan shows the principal part of the cave. A central passage 150 feet long, nine feet broad, and nine feet high, has on each side a number of doors and staircases leading to rooms of different sizes but all excavated on the same principle. Passage and rooms are all vaulted and of a uniform height of nine feet to the top of the vault, which starts from a slightly projecting edge about four feet from the floor. The top is marked in its whole length by an incision one inch broad and half an inch deep. Walls and roofs are finely and elaborately cut with a pickaxe, and in some of the rooms the walls are divided into

square panels and the roofs into bands or stripes two feet broad, every second panel or band standing out in relief.

A remarkable feature in these caves is that each room has attached to it a small, usually square room, with a round well eight to ten feet deep and about $2\frac{1}{2}$ feet in diameter. The caves are, as already mentioned, about 200 feet above the level of the river, and the hills are without springs or water of any kind. Two of the wells were filled up with a black earth quite different from anything found in the hills. The other wells were clean and empty, but at the bottom of each was a layer of mud a few inches deep such as would have been deposited in the course of time if the wells had been filled with water from the river. The most likely supposition seems to be that water has been carried up and the wells filled by hand. Unfortunately I had not time to have this done, so as to ascertain whether the sandstone was sufficiently hard to retain water.

The entrance leading from the central passage to each room is about four feet long, $2\frac{1}{2}$ feet broad and four feet high. Each entrance has been shut by folding doors on wooden hinges such as are still used in Persia and Afghanistan. There is no trace of the doors, but the holes cut in the stone for the hinges and another hole to the left of each door, large enough to pass the arm through and draw back the bolt, leaves no doubt as to the existence of the door.

A few detailed remarks will now be sufficient to explain the plan.

The room first discovered was No. I. in Fig. 2 in the upper story. This room is built in the form of a cross. The central vault is round, the other vaults, as everywhere else, are pointed. The recess opposite the entrance is a true recess separated from the remainder by a ledge of sandstone about a foot thick and two feet high. The roof in the part containing the entrance has fallen down with part of the walls, the other parts of the room are in a state of perfect preservation. In the western end a small round hole just large enough for a man to pass through leads to room No. II., and a round well with an inclination of about 75° leads to room No. I. in the lower story. In the eastern end is a round hole frequently used (the edges are quite smooth and slippery) and leading to room No. III., which contains the staircase by which we first entered the lower story. This staircase has six high steps, it ends in the vault of room No. I (lower story) and there is a drop of $4\frac{1}{2}$ feet down to the floor. The staircase was evidently constructed after the room (lower story I.) had been finished, and it looks as if it had been an after-thought. The original communication with the upper story was evidently through the above-mentioned slanting well or round channel which ends in an arched doorway clearly forming part of the original plan of the room. A third communication with the upper story is through an irregular opening above the entrance to the well-room, and

leading to room No. II. in the upper story. This aperture does not seem to form part of the original construction.

Room No. II. in the lower story has at the end a shelf of solid rock four feet high, four feet broad, and occupying the whole width of the room.

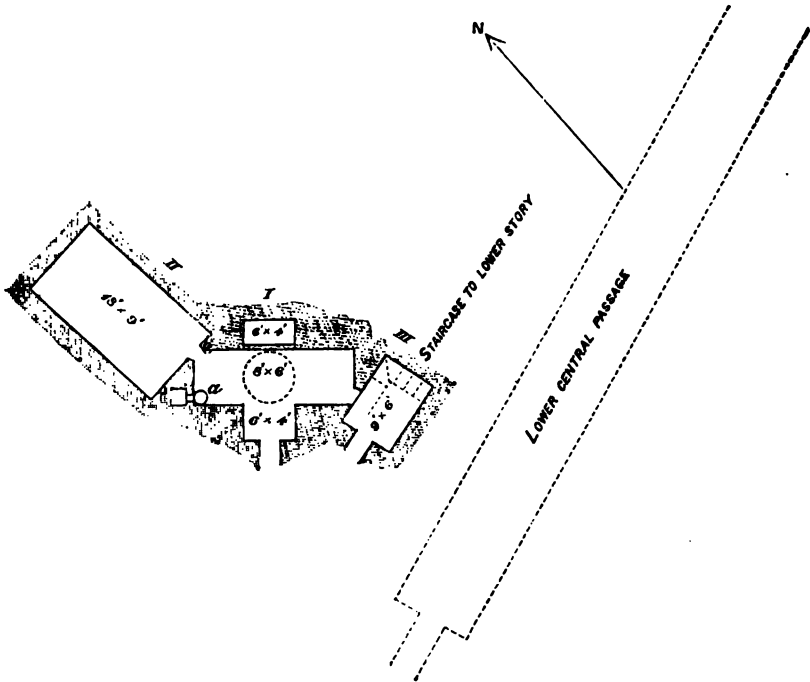


FIG. 2.—YAKI DESHIK CAVES (Upper Story).

a, Slanting well leading to corner of room I. in lower story.

b, Hole leading to room I. in lower passage above entrance to well-100m.

Floor of left-hand room about 5 feet lower than central room and 7 feet above floor of lower central passage. Central part of central room has a round vault, other parts have the ordinary pointed vaults.

Room No. III. has four narrow staircases all beginning about five feet from the floor, and leading to separate upper rooms of a somewhat rougher construction and probably used as store-rooms. The staircase in the central passage between II. and III. leads to an upper room connected with the rooms to which access is also gained by staircases 1 and 2 in No. III. In this room is a recess separated from the room by a ledge of rock four feet high and $1\frac{1}{2}$ feet thick. A similar ledge divides the recess into two square compartments. These were half-filled with a very light brown dust, evidently decayed vegetable matter, and still containing a few bits of reeds a few inches long and as thick as an ordinary pencil. A thin layer of a similar kind of dust covered the floors

of all the upper rooms, to which access is gained exclusively from the lower passage. They may probably all be considered as store-rooms.

Only room No. XII. now requires special mention. The northern well-room, which has no well, is connected by an opening in the wall with the well-room of No. XI. The second room has, as shown in the plan, five recesses, four feet broad and four feet deep. These are separated from the room by concave ledges of rock four feet high at the ends but cut down to one foot in the centre. Floor, walls, and roof are of the ordinary kind.

The central passage is dimly lit from the entrance and the floor slopes upwards, the entrance being about 10 feet lower than the upper end. The rooms are all perfectly dark. A number of small cuttings in the walls of each room, particularly above the entrance, evidently gave room for small lamps. The walls round some of these cuttings are still slightly tinged with soot. No inscriptions or carvings were found anywhere. The floor of some of the rooms was entirely covered with the excrement of leopards. The head of a fox was found in one of the wells. Otherwise the caves were perfectly empty, but as well preserved as if they had been abandoned yesterday.

In room No. I. of the upper story was found a linen bag containing a gold coin and about 100 silver coins; all apparently Mahommedan coins, from about the twelfth century, possibly somewhat older. This bag was not, however, found on the floor of the cave, still less in any hidden recess. It was found about half-way down in the sand, and must consequently have been deposited at a time when the caves were abandoned and already partly filled with sand. The coins have evidently nothing whatever to do with the original inhabitants of the caves. My supposition is that they have been hidden there by some inhabitant of the ruined town in the neighbourhood, where somewhat similar coins are occasionally found.

The caves now described are the most extensive of their kind in Penjdeh, but many other caves, similarly constructed but containing only a few rooms, are found all along the valley, and I have heard of caves at Gharebil in the "Chol," 50 miles east of Penjdeh. The entrance to the caves is as a rule on a vertical cliff some 20 to 30 feet above the nearest accessible slope. Where the entrance now is directly accessible, this seems clearly due to the crumbled state of the sandstone and the gradual deposit of sand forming a slope where the cliff at the time the caves were made was still vertical. In the case of one cave I visited, the cliff was so well preserved as to show clearly how access was gained. Two parallel rows of incisions led from the entrance of the cave down to a shelf of rock, which could be reached without much difficulty from below. Suspending a rope from the cliff above the entrance (afterwards from the entrance itself), it was not difficult to get up, using the incisions as steps and holding on to the rope with both hands.

Next in importance to the caves of Yaki Deshik (meaning "two holes"), come the caves at Bash Deshik ("five holes"), about three miles higher up, but they are only a series of isolated rooms. Large caves are said to exist where Penjdeh joins Maruchak, but the unexpected Russian attack obliging us to leave Penjdeh suddenly, prevented me from going to the place indicated.

Ruins.—The only points of interest that meet the eyes of a traveller passing through Penjdeh are:—New Penjdeh, Old Penjdeh, and Ak-Tepeh.

New Penjdeh is a large enclosure surrounded by mud walls, built by Aman Niaz Khan in 1845–50, and abandoned in 1857, when the Sariks drove the Ersaris out of Penjdeh.

Old Penjdeh is also a large enclosure surrounded by the ruins of very high and thick walls, but these walls and their flanking towers are for the greater part built of baked bricks. There are no buildings inside the enclosure, and no tradition regarding the building and destruction of the fort. The shape of the bricks and the construction of the place seem to indicate that it was built some time in the fifteenth or sixteenth century, and it was probably destroyed during the latter part of the last century.

Ak-Tepeh is a point of much greater interest. One of the old Arab geographers, Ibn Khordadbeh, I think, describes Qarinian as a guebre village on the top of a high hill near the river and surrounded by a plain. Qarinian is further said to be 24 farsakhs from Merv. Ak-Tepeh corresponds exactly with the description given of Qarinian, and the distance is very nearly correct if we take the average farsakh of four to five miles. At all events, I have followed and carefully examined the Murghab from Bala Murghab, 160 miles from Merv, to Sanduk Kushan, 70 miles from Merv, and within this space Ak-Tepeh is the only place in the least like the description. I have further ascertained by careful inquiries that going nearer to Merv, the only place which could possibly resemble Qarinian is a hill near Chehar Bagh, between Merv and Yulatan, or not much more than 20 miles from Merv. No antiquities or coins have been found by digging, only remnants of bricks and earthenware vessels. Nor could it be expected that a poor guebre village would leave any trace of its existence.

Penjdeh contains, however, ruins of much greater interest than those which would attract the attention of a mere passer-by. On the left bank of the Murghab, close to and south of Old Penjdeh, are the ruins of a large town. Only heaps of clay covered with grass indicate its existence, but the numerous irrigation cuts show remnants of mud walls and occasionally a brick building. This town must have been about three miles long and somewhat more than a mile broad. No antiquities or coins have ever been found here, which would seem to indicate that the town has been abandoned voluntarily, or at least under circumstances allowing the inhabitants to carry off all their property.

This was apparently not the case with another town situated on the right bank of the Murghab, on the bank of an old channel of the river. The ruins begin almost opposite Old Penjdeh, and extend for about five miles towards Ak-Tepeh, with a width varying from one to two miles. Only grass-covered hills are seen, but some of these clearly indicate the presence of very large castles or forts, and whenever digging is attempted, walls and sometimes complete rooms are brought to light. I employed numerous workmen here for about a month, and found a considerable number of coins and other interesting articles. The southern part of the town was apparently mud-built, whereas the centre and the northern parts principally consisted of brick buildings. The only complete room I found was paved with ordinary bricks, and the walls were whitewashed and afterwards painted grey. No ornamentation and no inscriptions were found. The coins found were all Mahommedan coins. The other things were copper and brass utensils of every-day use, most of them well shaped, with finely engraved ornaments and frequently Persian inscriptions. Small birds and animals made of brass, apparently toys, were found in great number. On the whole, it looked as if the town had been sacked, all valuables carried away, and the inhabitants killed or carried off as slaves. They would never voluntarily have left these numerous and to a certain extent valuable things of every-day use.

I am sorry to say that I lost the greater part of the coins and all the other things in my collection during our retreat from Penjdeh. The boxes were too heavy for the mules, and it was of course impossible under the circumstances to re-pack or provide for other means of transport.

I have at present in my possession only about a thousand copper coins found in a well-shaped china jar with a Persian inscription. The jar is lost. The coins are all Mahommedan, and Captain Talbot has recognised several as common coins of some of the Pathan rulers of India. A great number are unknown to us, but some of them are very well preserved, with perfectly clear inscriptions.

No tradition exists regarding the origin, destruction, or name of this town. Judging from what I have seen, I feel inclined to believe that the town is old, and that it was not finally destroyed till some time during last century.

Ruins exist in many other places in Penjdeh. On the left bank of the Murghab are the ruins of two forts and traces of two towns, one north of New Penjdeh and one east of Ak-Tepeh. On the right bank of the river are several groups of ruins between Yaki Deshik and the large town already described, but none of those ruins have been explored.

I tried in vain to discover some of the old graveyards, which must have contained marble steps with inscriptions like those found in several places in Badghis. The Sariks, when I asked if they could

explain the absence of old graveyards, said that they thought it likely that all who could afford it had carried their dead to Hazrat Imam (half-way between Penjdeh and Yulatan), where there are large graveyards with numerous inscriptions, though the place itself is too small to have been inhabited by more than a few families at a time. This might indeed explain the absence of inscriptions, which would be found only on the graves of well-to-do men, but it would not explain the entire absence of old graveyards (one such does exist close to New Penjdeh, but it is neither very extensive nor very old), and I think the more likely explanation to be that the former inhabitants of Penjdeh have, in accordance with the old and still prevalent custom, had their graveyards on the hills bordering the valley, and they are now buried under the sand, which is steadily advancing in several places, and more particularly near the old town on the right bank of the river, where the Sariks showed me some high hills covering ground which on their arrival twenty-eight years ago had been a fertile plain.

This sudden and violent advance of the sandhills is, however, limited to two distinct spots in the valley; elsewhere the advance is very slow, and in some places almost imperceptible.

*The Geographical Nomenclature of the disputed country between
Merv and Herat.*

By ARMINIUS VAMBÉRY.

GEOGRAPHERS are but rarely philologists and still rarer Orientalists. Owing to this deficiency we find that a large number of the proper names of the oro-, hydro-, and topography of Central Asia has been remitted to the student of geography in an erroneous form, and having been thus put down in our maps, I am sorry to remark that most of them are sadly wanting a revise. It is not merely the much and frequently discussed method of transcription which has caused the evil, but rather the utter ignorance of modern travellers in the respective eastern languages, and consequently the incapability of noting down correctly the proper names heard by them on the ground of their exploration. To this we may add the difficulty of transcribing Persian, Arabic, and particularly Turkish words with an English or Russian alphabet, where in the former the *ö*, *ü*, *kh*, and *j* (French), in the latter the *ö*, *ü*, and *h* are wanting, so that the best intentions must fail, and correctness, so essential in geographical nomenclature, must get the worst of it.

To revise the maps of all Central Asia is a task arduous beyond measure; and in spite of my having undertaken it years ago, I do not flatter myself with hope of eradicating long-standing mistakes by the

publication of my large Geographical Dictionary, which will soon be ready. With Merv and the Badghiz, however, the case is a different one. Here the geographical names have come quite recently into use, they have not taken yet a firm root with readers and students of geography, and a revised nomenclature may well succeed to establish a correct spelling of the proper names instead of the erroneous one. This is the reason for my publishing the present paper, and I have only to regret that the cartographical material at my disposal is a limited one, and that consequently such names may have been left out which occur on maps unknown to me.

In my method of transcription I have followed the one usual with English geographers, adding however for the sake of correctness the Persian and Turkoman orthography of the respective names. It is only to the names given by M. Lessar on his map published in the 'Scottish Geographical Magazine' (vol. i., Nos. 5 and 6) that I added an L, being a reference to that traveller, whilst to others, such as the diagram of Sir Henry Rawlinson published in the 'Nineteenth Century,' April 1885, of Mr. Boulger, published in his 'Central Asian Question,' &c., no reference has been made. The abbreviations used are, r. = *rectius*, T = Turkish, A = Arabic, P = Persian.

- T. *Adam-ulan* (L.), ادم اولان, i. e. the ford of Adam or "of the man"; name of a well of fresh water in the desert east of Pul-i-Khatun.
- T. *Aimak-Djer*, r. Aimak-yar, on the left bank of the Murghab, six miles in the north of Pul-i-Khishti.
- T. *Aj-elan-guzer* (L.), r. Ay-ulan, ای اولان, i. e. "the moon passage"; name of a passage across the Lower Murghab, about 14 miles south of Yol-öten. The Persian word *guzer*, meaning a passage, is quite superfluous here.
- T. *Akar chishme* (L.), r. Akar-chashma, اكار چشمه, i. e. "the flowing fountain"; a place in the north of the Elbirin-kyr.
- T. *Baba-kember* (L.), r. Baba kamber, بابا قنبر, i. e. "father Kamber"; the name of a Turkoman saint and of a place on the Lower Murghab.
- P. *Badghiz*, باد غیز, name of the district between the Murghab and the Heri-rud, stretching on the north to the edge of the desert. The older and more correct spelling of this word is Badkhiz, باد خیز, being derived from *bad* = wind and *khiz* = to rise; it means, therefore, "the place where the wind rises."
- P. *Bala-Murghab*, بالا مرغاب, i. e. the Upper Murghab, in distinction to Payin-Murghab = the Lower Murghab, by which name this river is designated from Penjdeh downwards.
- T. *Borkut*, r. Börküt, بوركوت, name of a mountain, being a series of hills, by which the Paropamisus unites with the Elburz range, or Persian Mountains. Börküt means an *eagle* (*aquila fulva* or *chrysactos*).
- T. *Chakmakli*, چاقماقلى, a place to the east of the Zulfikar Pass and in the south of Kungrueli, literally meaning "the place of flints."

- P. *Chaman-i-bed*, r. Chemeni-bid, چمن بيد, i. e. "the meadow of willow," an evident allusion to that kind of trees growing on that meadow.
- P. *Char-bag* (L.), r. Chihar-bag, چهار باغ, i. e. "four gardens," properly one garden divided into four equal parts, as usual in Central Asia; name of a place 10 miles south of Yol-öten.
- T. *Chepli-Tepe* (L.), r. Chöpli-Tepe, چوبلی تپه, i. e. "the thistle mound"; name of a place on the left bank of the Lower Murghab, about 34 miles south of Yol-öten.
- P. *Cheshme-i-Sebz*, چشمه سبز, name of a place and of a pass in the Börküt mountain.
- P. *Chihil Ghez*, چهل کر, i. e. "forty yards"; name of a place in the Nihalshini Pass.
- P. *Dahan*, r. Dihan, دهان, translated by modern English travellers as *gap*, means literally *mouth, entrance, embouchure*.
- T. *Dangli*, r. Dengli, دنکلی, name of a tower in the Zulfikar Pass, literally meaning the *trying place*. It occurs also as *Deng*, which means *try*.
- T. *Dash-kepri*, r. Dash-köprü, داش کوپری, i. e. "the stone bridge," the Persian name of which is Pul-i-khishti, "the brick bridge." Name of a bridge where the Khushk flows into the Murghab.
- T. A. *Dash robot*, r. Dash-rabat, داش رباط, "the stone building."
- T. *Elbirin-kyr* (L.), البیرین کیر, the tableland of Elbirin, under which name M. Lessar designates the chain of hills stretching from the Heri-rud eastwards round the Ir-ulan Lake towards the Khushk. The literal meaning of Elbirin is *sufficient, enough*, but I cannot make out the relation of such an adjective to the tableland in question.
- P. *Garmab*, r. Ghermab, گرماب, i. e. "hot water"; name of a pass or route south of Pul-i-Khatun.
- T. *Geok-Tepe*, گوک تپه, r. Gök-Tepe, "the green mound," a name of several places in the Turkoman country. There is one Geok in the east, and one in the south of Merv (L.).
- P. *Gouz-i-Khan* (L.), r. Hauz-i-Khan, حوص خان, i. e. the reservoir of the Khan, on the road from Merv to Sarakhs; also the name of a ruin on the bank of the Khushk.
- T. *Gulran* or Gurlan, r. Gürlen or Gürten, گورلان, a place near the Khombau Pass to the north of the Börküt mountain. Gürten is also the name of a town in Khiva, and means literally *noisy, clashing, trembling*.
- P. *Heri-rud*, هری رود, i. e. "the river of Heri." Heri is the old name for Herat, and remained in use as late as the sixteenth century.
- T. *Irolan*, r. Ir-ulan, ار اولان, i. e. "the ford of men, or of the brave." In the English maps this place is put down in the desert, north of Sarakhs, whilst in the map of M. Lessar it is to be found south of that place, and designates at the same time the salt lakes south of the Elbirin.
- A. T. *Kala-orun* (L.), r. Kalai-urun, قلعه اورون, i. e. "the place of a fortress"; name of a ruin on the way from Merv to Sarakhs.

- A. *Kale-i-Mour* or *Mor*, r. Kala-i-Mar, قلعه مار, i. e. "the fort of Merv"; name of a ruin on the left bank of the Khushk.
- P. *Kaman-i-Bihisht*, کمان بهشت, r. Keman-i-Bihisht, a place on the right bank of the Heri-rud, meaning "the vault of the Paradise."
- T. *Karvan-ashan*, کروان اشان, a pass in the Bōrkūt mountain, meaning "the place where the caravans cross."
- T. *Kazakhly*, or Bend-i-Kazakhly (L.), r. Kazikli-bend, قازوقلی بند, i. e. "the dam of pegs" on the Lower Murghab.
- T. A. *Kel-Gouz* (L.), r. Kelle-Hauz, کله حوص, i. e. "the skull-reservoir"; name of tank on the road from Merv to Sarakhs.
- T. *Kele-burun* (L.), r. Kelle-burun, کله بورون, i. e. "the cape of the skulls," originating probably from a heap of skulls erected on a promontory or on a protruding portion of the land. A place on the Murghab, about 42 miles south of Yol-öten.
- T. A. *Kelte-minar*, کلتہ منار, i. e. "the short spire," being the name of a place 16 miles south of Merv.
- P. *Keriz*, کاریز, r. Kariz, i. e. a canal for irrigation, literally meaning a contrivance for irrigating. There are several names composed with *K*, such as *Keriz-i-Iljas* (the Elija canal), *Keriz-i-Shembe* (the Saturday canal), *Keriz-Bengi* (the opium-eaters' canal), &c.
- A. T. *Khandek-Medemii-Khana* (L.), r. Khandak-Mehemmed-Emin-Khan, خندق محمد امین خان, i. e. the ditch of Mehemmed Emin Khan (vulgarly known as Medemin Khan), a ruler of Khiva, by whose order this ditch was dug. Name of a canal flowing from the Murghab.
- T. A. *Khojam-Shukur* (L.), خواجہ شکر, i. e. "Thanks, my Lord!" eventually also a proper name of a molla or some religious person.
- T. *Khombou*, r. Kom-bau, قومباو, i. e. a knot, a hench, an uneven elevation; name of a pass, of a ford, and also of a rivulet issuing from the Bōrkūt mountains.
- P. *Khushk*, also *Kushk*. Which of the two be the correct transcription, I am unable to decide, having no personal experience on the matter. If *Kushk*, کوشک, then the word would mean a *kiosk*; but if *Khushk*, خشک, then it would signify *dry*, an allusion to the frequent disappearing of this river, and leaving an empty, dry bed.
- P. *Koshut-kala*, r. Khurshid-kalesi, خورشید قلعه سی, i. e. the fort of Khurshid; ruins near Old Sarakhs.
- T. A. *Koshut-khan-kala*, خورشید خان قلعه سی, r. Khurshid-khan-kala'si, "the fortress of Khurshid Khan," for it was the last-named Tekke-Turkoman chieftain who erected the mud wall known under this name twenty years ago.
- T. *Koyun-kui* (L.), r. Koyun-kuyusi, قویون قویوسی, i. e. "the sheep well"; name of a well in the desert between Pul-i-Khishti and Shir-Tepe.
- T. *Kuche-kum* (L.), r. Kichi-kum, کیچی قوم, i. e. "the small sand," on the road between Merv and Sarakhs.

- P. *Kuhsan*, *کوهسان*, a frontier town of Herat, literally "towards the mountain," or the place where the mountain begins.
- T. *Kungrueli*, Kangruli (L.), r. *Kongrauli*, *قونگراولو*, i. e. "the place of the bell," from *kongrau* = bell jingle. A place marked on the English maps in the north, in M. Lessar's map in the south of the Elbirin.
- T. *Kyrjukli* (L.), r. Kuyrukli, *قویروقلی*, literally meaning "having a tail"; name of a place south of Yol-öten.
- T. *Maruchak*, *مروچاق*, pronounced by the Turkomans *marshak*, means literally "little Merv," from *Mar* = Merv and the diminutive *chak* or *chek*.
- T. *Medemii-khan-kani-tepe* (L.), r. Mehemedin khan khanli tepe,

محمدامین خان قانلی تپه

i. e. "the bloody mound of Medemin Khan"; name of a mound in the north of Sarakhs upon which the aforesaid ruler of Khiva was surprised and killed by the Persians.

- P. *Merv*; *مرو*; the Turkomans call it *Mar*, decidedly the more correct version, considering that the holy scriptures of the Parsees designate this place by *Maru*, and that the Greeks likewise called it *Margiana*. The Turkoman version of *Mar* vindicates the fact that there was a Turkish population around Merv even in remote antiquity.*
- A. T. *Mulla Hairan-Taka*, *ملا خیران تکه*, r. Mulla Khairan Tekke, i. e. "the Tekke Molla Khairan"; a place in the north-east of the Zulfikar Pass, containing three wells.
- P. *Murgab*, eventually Murghab, *مرغاب*, name of a river, literally meaning "the bird-water," an allusion to the rapid or flying current of that river.
- P. *Nihalshini*, *نہال شینی*, name of a pass situated on the right bank of the Eri-rud. It means the "sprout of joy."
- P. *Nimaksar*, *نیمکسار*, r. Nemeksar; name of a salt lake and of the country around it, evidently the Persian designation of the *Ir-ulan* salt lakes of Lessar. Nemeksar means literally "a salt place."
- T. *Orush Togain*, r. Urush-Togay, *اوروش طوغای*, i. e. "the battle-wood"; name of a place between Penjdeh and Sari-Yazi.
- P. *Penjdeh*, *پنجده*, i. e. "five villages"; a place inhabited by Sarik Turkomans, and belonging from immemorial times to the district of Herat. There are three places of that name: 1, Kohne P. = the old P.; 2, Taze-P. = the new P.; and 3, Penjdehi Nadiri = the P. of Nadir. The Turkomans pronounce this word *Pende*, or *Pendi*.
- P. T. *Pistalik-Attak*, r. Pistelik-Etek, *پستلک اتک*, "the skirt where pistachio grows," name of a place on the frontier claimed by Russia on the map of Major Holdich and Captain Peacocke.
- P. T. *Pul-i-Khatun*, *پول خاتون*, i. e. "lady's bridge," evidently a structure erected through the charity of a lady.

* Vide Sir Henry Rawlinson's derivation and explanation of the name, *ante*, p. 578. —[Ed.].

- P. *Pul-i-Khishti*, *دول خشتی*. See Dash Kepri.
- A. *Robat*, *رباط* = "a building," a small sort of caravansary.
- P. *Rosanak*, r. *Ruzenek*, *روزنک*, i. e. "the little window," a place on the road from Herat to Persia.
- P. *Sarakhs*, *سرخس*, said to be the Syryn timer of antiquity.
- T. *Sari-Yazi*, *ساری یازی*, i. e. "the yellow plain"; name of a ruin on the aforesaid plain on the bank of the Murghab.
- A. T. *Shehidli*, Shegetli (L.), *شهیدلی*, i. e. "the place of the martyr"; name of a well on the road between Merv and Sarakhs, evidently derived from a Turkoman killed there by the Persians.
- P. T. *Shir-Tepe*, *شیر تپه*, i. e. "the lion mound"; name of a place on the Heri-rud to the north of Pul-i-Khatun.
- P. *Shor*, *شور*, i. e. a salt place.
- T. P. *Sumbar*, *سوانبار*, name of a canal (kariz) meaning "a reservoir of water"; a word composed of the Turkish *su* (water) and the Persian *anbar* (magazine).
- P. *Sindjao*, *Sinjao*, r. *سلجاب*, Sinjab, i. e. "squirrel"; name of a mountain in the neighbourhood of Herat.
- T. *Takir*, *تقر*, a firm clayish ground; a designation used in opposition to *Kum* = moving sand.
- P. *Tejen*, name of the Heri-rud after entering the Turkoman country. *Tejen* is a comparatively modern spelling of that name; for Abulghazi, the historian of the Central Asian Turks, writes, *تژن*, Tezhen, an orthography which aggravates still more the chance of translating this word.*
- P. *Tengi-Darya*, r. *Tenghi-Derya*, *تنک دریا*, i. e. "the river pass," name of a place where the Heri-Rud passes across the Bürküt Mountains.
- T. *Tepe*, *تپه*, mound. Vide *Ak-tepe* = white mound, *Kara-tepe* = black mound, *Kizil-tepe* = red mound, &c.
- P. *Tirpul*, *تیرپول*, a place on the Heri-rud, literally meaning "the arrow bridge."
- T. *Uch kui* (L.), r. *Üch kuyu*, *اوچ قویو*, i. e. the three wells; a station on the road from Merv to Sarakhs.
- T. *Yakitut* (L.), r. *Yeke-tut*, *یکه توت*, i. e. "the single mulberry tree"; name of a place in the north-west of the Khombau Pass.
- T. *Yulatan* or *Iol-otan* (L.), r. *Yol-öten*, *یول اوتان*, i. e. passage, crossing, from *yol* = the way, and *öten* = passing. Name of a place 30 miles south of Merv.
- A. *Zulfikar*, *ذولفقار*, the name of a ford and of a pass leading from the Heri-rud towards the plain in the east of Herat. *Zulfikar* means, literally "the two-edged," and is the name of the famous sword of Ali the Khalif, which was bequeathed to him by the Prophet.

* Vide Sir Henry Rawlinson's derivation, *ante*, p. 581.—[Ed.].

Two Recent Russian Travellers in the Caucasus.

By DOUGLAS W. FRESHFIELD, SEC. R.G.S.

Two straightforward, graphic, and instructive papers on the mountain chain between Kasbek and Elbruz by Russian travellers have recently appeared in 'Petermann's Mittheilungen' (vol. xxx.). It is not so much the extent of their travels—they cover hardly any ground that has not already been described to English readers by Mr. Grove, Captain Telfer, Mr. Philipps-Wolley, or myself—as the interest of the region described, one of the future "playgrounds of Europe," that entitles them to notice. Here is a district bristling with peaks as high as Mont Blanc and Monte Rosa unexplored and unmapped, at any rate in the Alpine sense of the terms. For the geologist, the student of glacier action, the entomologist, the botanist, in particular for the ethnologist and student of languages as well as for the skilled mountaineer, there is abundant work to be done. We shall soon hear more of this country when the scientific world and the thirty-five thousand members of Alpine Clubs become alive to the fact that it is now only six days' journey from London to the foot of Elbruz.

In the greater part of the papers under notice Russian readers may find the charm of novelty. In England it is needless to repeat a mass of facts, of topographical information, or appreciations of scenery, which have long been before the public. I propose to deal briefly therefore with the general narratives and to confine myself to bringing forward such new information as I have myself gleaned from their perusal.

Let us take first M. Iljin's two papers on "Ushba"; an account of a sojourn in Svanety, and a visit to the glaciers around the base of the double-headed giant of the Caucasus. M. Iljin writes as an enthusiast with a keen and critical eye for mountain scenery. He particularly notices how the majesty of the great snowy chain is enhanced by the soft rolling outlines of the intervening spurs, when the traveller catches his first view of it from the limestone ridge that encloses Svanety on the south. It is worth remark that north of Mont Blanc an identical geological arrangement produces a similar picturesque effect. "When one sees Ushba for the first time," he exclaims, "one has no eyes for anything else, all else appears insignificant and pale." When a few more Russians catch M. Iljin's spirit, the exploration of the Caucasus will begin in earnest.

First we note the complete confirmation of Mr. Philipps-Wolley's report, that Svanety is now safe, next that it is still practically virgin ground for the mountaineer. "The mountain walls that hem in the basin are almost entirely unexplored. The heights of only three passes in the minor chains south and east of the Ingur have been ascertained. No single peak, no single pass in the main chain has been accurately

measured. M. Gileff has with a mountain compass fixed the height of Tetnuld as 15,314 feet," an estimate which, as M. Iljin remarks, agrees tolerably closely with that given in the 'Central Caucasus,' 15,500 feet. In default of more certain knowledge, he is also inclined to accept my provisional estimate for Ushba (16,500 feet). Betsho, the village at the foot of Ushba, is now the centre of administration and the seat of a magistrate, who appears to be able to keep order among a population long unused to it. M. Iljin gives an interesting sketch of the Svanetians, confirming that of Radde. There is no doubt whatever of their Georgian affinities. No one, so far as I know, has yet remarked that the classical name of this tribe was shared with it by two Alpine tribes. The Suanetes and Consuanetes appeared on the trophy of Augustus which gives its name to Turbia. The villages at the eastern extremity of the basin, where the English party in 1868 narrowly escaped, and Russian officers subsequently fell victims to, the passions of the "Free Svanetians," have long harboured the most barbarous communities in the Caucasus. But these have now learnt a lesson by the destruction of the murderers' towers; and the more western and comparatively civilised Mtlach valley, the best base for mountain explorers, is absolutely safe, while at the foot of Ushba itself the traveller finds a hospitable reception, and natives ready to serve as porters on ordinary excursions at a reasonable rate. For M. Iljin's excursions to the glaciers of Ushba, for his appreciation and careful descriptions of the glorious twin-towers from different aspects, we must refer our readers to the 'Mittheilungen.' He has given us a new catalogue of the passes across the southern chain. West of the Latpari Pass, 9273 feet, there are three passes—the Ljassil and Mushur Passes, both over 10,000 feet, and the Leshmel Pass, 9972 feet. By the Ljassil Pass, Lentechi on the Zenes-skali can be reached *in one day* from Betsho, and the Mushur Pass is frequently crossed in winter. The most serious omission in the papers is the absence of any information on the passes northwards across the great chain between the Betsho Pass (crossed by M. de Déchy) and Tau Tetnuld.*

* Mr. Moore allows me to supply this deficiency by the following note based on the experience of his two visits to the country in question.

Note on Passes across the Caucasus between the Mamisson and the Makra :—

1. The Karagam (see Freshfield's 'Central Caucasus').
2. The Gurdzi-vesk. Marked on the Russian five-verst map. Our route of 1868 was a slight variation of this. See 'Central Caucasus,' and M. Dinnik's paper in 'Petermann's Mittheilungen' for 1884.
3. The Gebi-vesk. From the Upper Uruch to Gebi. Marked on the map. There is an account of it in Klaproth, purporting to be from personal experience; but no name is given. He appears to have crossed from the Uruch by this pass and returned by No. 2.
4. The pass from the Rion to the Upper Tcherek, crossed by my party in 1874. Marked on map. See Grove's 'Frosty Caucasus.'
5. A parallel pass, marked on the map, as to which I have no information.
6. A pass, marked on the map, from the Zesku branch of the Zenes-skali to the

M. Dinnik went from Naltshik up the limestone gorge of the western Tcherek, which appears to rival that of its sister stream, to Bezingi. Here he fell into the route of Mr. Grove and followed it to the foot—no farther—of Elbruz. Again he went up from Alagir near Vladikafkaz, along the road M. de Déchy subsequently followed, to the upper valley of the Ardon, where he fell into our 1868 route and followed it over the Mamisson Pass to both sources of the river, and then over the Gurdzi-vesk Pass to the great Karagam Glacier. The fresh facts we gain from him are chiefly as to the motion of the Caucasian glaciers; he shows that with two exceptions the glaciers of the chain have been in retreat for the last twenty years. The Bezingi Glacier, for instance, has retreated more than two kilomètres since 1860. The exceptions are the Mishirgi Glacier at the head of the Bezingi valley, which has advanced 1400 feet during two years (1880–1) and the Adyl-su Glacier south of Urusbieh. The advance of the latter glacier is attributed to a rock fall which has covered for a space of many acres the lower part of the ice-stream with a thick layer of rubbish, which is supposed to have hindered its melting and thus accelerated its progress. I confess to

Upper Tcherek. It must be high, and on the south side very steep. It is marked to the west of a peak called “Tau Tezev-tzek” or “Gezev-tzek.” This part of the chain is called, I believe, locally “Maschquar.” After my return in 1874, I asked Captain Telfer to inquire of the Russian officer with whom he had visited Svanetia, whether he knew anything as to the existence of this pass; the reply he received implied that it was unknown to the writer.

7. A pass from Bezingi to the Ingur valley. Marked on the map, but certainly in a wrong direction on the south side. The route, I am satisfied, is not to Adish, but to Mulach, and goes not *east* of Tau Tetnuld as marked on the map, but west, or north-west of it. I made a good many inquiries at Bezingi, with no definite result. There was a general agreement that it was possible to cross the glaciers into Svanetia, but as to the character of the route and the distance to the first village on the other side no two persons told the same story; according to one, the way was practicable for a horse, and Mulach only a day distant, while, according to another, the passage was difficult even for “a dare-devil hunter,” and required three days at least. I saw no one who spoke from personal knowledge. We ourselves saw pretty nearly all the north side of the pass, which cannot be much under 12,000 feet, presents on that side no particular difficulty to mountaineers, but must be utterly impracticable for animals.

8. The Gara Tau. 9. The Bashil Tau. Tchegem to Mulach. Marked on the map. Passes under these names are known at Tchegem, where I was told that both, though traversing glaciers, were practicable for horses, the Gara Tau being the easier of the two. Mulach was said to be two days' journey from Tchegem. I did not hear the name “Thuber,” mentioned by Radde, but it probably applies to one of the glaciers on the south side.

10. M. Dinnik mentions a pass from Urusbieh to Mulach up the glen of the Adyl-su which opens immediately opposite Urusbieh, but it is probably high and difficult. There is a peak in that direction that resembles the Schreckhorn from the Lauteraar glacier.

11. The Betsho Pass. Crossed by M. de Déchy, and compared by him to the Alphübel. This is probably the route by which, according to Captain Telfer, 300 Kabardah militia crossed to Betsho in 1875 to put down some disturbances in Svanetia.

12. The Makra Pass (see ‘Central Caucasus’).—A. W. M.

doubting the sufficiency of the cause alleged. It is interesting to find how closely the general periods of movements of Alpine and Caucasian glaciers appear to correspond. The Alpine glaciers have since 1880 halted in their retreat, and some of them have begun to advance. A friend writes to me from Chamonix (June 1885), "the Glacier des Bossons is coming on splendidly."

The existence of a prehistoric glacial period, or periods, when the glaciers of the Caucasus extended far towards the plains, is amply proved by the remains of former moraines, but these appear to be much less extensive than in the Alps.

M. Dinnik does not add much to the light already thrown on the topography of the great glaciers above Bezingi. The English party of 1874 identified the gap at the head of the Bezingi Glacier with that at the head of the glacier of the Eastern Tcherek seen in 1868, and ascertained the fundamental errors of the five-verst map, which by misplacing Koshtantau has rendered the relation of the mountain ridges at first sight bewildering. The true positions and relations of the huge peaks of Dych Tac and Koshtantau and the junction of the main chain with its great spur remain to be defined. Tau Tetnuld appears, like the Schreckhorn, to be an isolated summit surrounded by a vast *névé*, the source, perhaps, of the Adish Glacier and Thuber Glacier on the Svanetian side, as well as of a portion of the Bezingi glacier on the north. Part of the long ridge of Koshtantau may lie in the watershed, but the northern point, probably the highest, is probably on the northern spur. These, however, are surmises which await verification. The second glacier flowing from the east into the head of the Bezingi Valley, is known as the Mishirgi glacier. In the five-verst map Koshtantau is wrongly represented as standing at its head about in the position really occupied by the Unknown Peak of my sketch (see 'Central Caucasus'). It really rises south-east of the head of the eastern branch of the Bezingi Glacier. The terminations of the Bezingi and Mishirgi Glaciers are respectively 6900 and 7500 feet above the sea, while the Zanner, the principal ice-stream flowing southwards into Svanety from the same *névé*, descends to 6612 feet (Abich), and the more eastern glaciers of Svanety reach, the Adysh Glacier 7500, Kilde Glacier, 7912 feet, Tshkarr Glacier, 7935 feet. The warmer exposure is, it will be noticed, more than compensated for by the far heavier snow-fall on the southern (the Black Sea) side of the chain. For the amount of food poured into their *névés* is the main factor in glacier growth. Here may be found the explanation of the fact that has puzzled some observers, that the Gorner glacier advances while the Findelen, coming apparently from the same *névé*, is in retreat. They overlook the feeder of the Gorner which pours down from the snow plateau of Monte Rosa. That plateau catches the heaviest of every south-western storm, and it is these storms that bring most moisture in the Alps. The remainder of M. Dinnik's first journey is little but a repetition of Mr. Grove's, and

with the exception of the description of the gigantic rockfall in the valley of the Adyl-su near Urusbieh, which he agrees with his predecessor in ranking among the most picturesque glens of the northern Caucasus, contains little that calls for notice in these pages.

We proceed therefore to his second paper, and to Alagir, the northern point of departure of the Mamisson road, the only pass not leading over glaciers between the basin of the Rion and Ciscaucasia, and equally important from an orographical and a strategic point of view. It is here that the watershed shifts from the central granitic chain to the parallel range of southern limestones.

The Ossete sanctuary of Rekom, in the Zéa Valley, visited also by M. de Déchy, is doubly interesting. It is the custom of the country for the lucky sportsman or treasure-finder to deposit here some part of his spoil. The outside of the building is decorated with horns. From these Herr Dinnik draws the conclusion that the *Ægoceros Pallasii* (which in the curvature of the horn, the longer tail, and other particularities more resembles the sheep) is only found about Kasbek and on the eastern ranges. The true *Capra Caucasica*, he asserts, is only found in the neighbourhood and west of Elbruz. Not a single pair of horns of the former beast are to be discovered at Rekom.*

The funeral mounds of Ossetia also furnish offerings to Rekom. In these mounds the diggers find occasionally gold ornaments—the gold that Jason sailed after!—these they do not seem to devote to religious uses; but armlets, rings, knives, lanceheads of the bronze period are among the curiosities of this strange mountain museum.

Now again I must pass unwillingly over scenes familiar to me, to become familiar I would hope to some of my readers, and declining to plunge

* Mr. Clive Phillippo-Wolley supplies the following note—"I make no pretension to being more than an unscientific field naturalist at best. I think I have Dr. Radde's authority for what I say about the tûr as well as my own opinion. Dr. Radde you may remember is the curator of the Tiflis Museum and a well-known naturalist. The tûr then is not the steinbock, which I take it is German for ibex. The tûr (*Capra Caucasica*) has the horns thrown out laterally from the head, instead of being curved right back toward the quarters as in the ibex. There are (Dr. Radde holds) two varieties of tûr in the Caucasus, distinguishable chiefly by their horns, which are in one case deeply serrated, like the horns of an ibex, in the other, smooth. The tûr is pretty general throughout the Caucasus, but the ibex, I believe, is only found in Ararat and the Eastern Caucasus. I myself have never seen or heard of ibex in Svanetia or any of the neighbouring districts, though I was looking carefully for signs of its existence for some months. On the other hand I have seen the ibex in Daghestan and know that it abounds on Ararat. No doubt the name tûr is sometimes misapplied by the natives to any mountain goat or sheep, just as I see, in one of my books, I have written ibex for tûr. I append measurements of a fairly large tûr's head now in my possession, which came from Svanetia.

Round the butt	12½ inches.
Length of single horn inside the curve	20½ "
Widest space	28 "

CLIVE PHILLIPPS-WOLLEY."

once more into the entrancing loveliness of the Rion sources or to revisit the tangled glens of Gebi, hasten to climb in company with M. Dinnik the Gurdzevesk Pass. He gives its height as 11,000 feet, which corresponds closely enough with the 11,250 feet of the party of 1868, who, missing their way, crossed the watershed at a perhaps slightly higher point somewhat east of the true pass. Hence he descends to the great Karagam Glacier (*tachete* he tells us is the Ossete, *tschiran* the Tatar for glacier). Herr Dinnik, like Herr Abich, entirely ignores its exploration in 1868 by our countrymen. His estimate of its length of 21 versts, and his statement that the natives count it a day's journey in length, must be taken as applying to the distance between the shepherd's quarters at the foot of the great icefall and the terminal moraine. Of the "shining tablelands" above, no native knows; and if these are included, this noble ice-stream which, according to M. Dinnik retains the pure colour of its ice down to its lower extremity, need hardly fear comparison with the Swiss Aletsch.

It may be noted also that M. Ivanoff, the explorer of the Pamir, has recently described* an attempt to ascend Elbruz which was unsuccessful. Readers of M. Ivanoff's paper must be warned that his estimate of mountain difficulties and his advice in matters of mountain-craft are not in accordance with the experience of Alpine climbers.

M. Muromtsoff's papers on the Caucasus in the 'Proceedings of the Viennese Geographical Society,' 1880, 1881, and 1884, are full of inaccuracies and not to be relied on. The statements concerning myself have been fully discussed in the 'Alpine Journal,' No. 89.

Dr. Radde's work on 'Die Chevsuren,' though published some years since, has hardly been noticed in England, and I may therefore call attention to it here. It is not only, as its title implies, a monograph on one of the most interesting tribes of the Caucasus, who occupy the mountain fastnesses between Ossetia and Daghestan; it is also an interesting book of travel, and contains the only description of the southern valleys, the glaciers, and the passes of what Dr. Radde calls the "Tuschinian Alps," the granite range of which Tebulos (14,771 feet) is the loftiest summit. This range appears to me orographically important as the continuation of the central crest of the Caucasus, which from the Mamisson Pass eastwards is broken by tremendous gorges and ceases to correspond with the watershed.

* Transactions of the Imp. Russian Geographical Society of St. Petersburg, 1884.

*Lieut. Victor Giraud's and Herr Reichard's Explorations in the Lake Region of Central Africa.**

THE sketch-map which accompanies this notice is merely preliminary, but the interest which attaches to the two expeditions, the main results of whose geographical explorations it embodies, is so considerable, that we do not hesitate in placing it before the readers of the 'Proceedings,' even though it is sure to be superseded at an early date by a more correct map. Lieut. Giraud, of the French Navy, has given us a delineation of Lake Bangweolo which differs widely from that first published by Dr. Livingstone, as a comparison of his sketch with the Society's map of Eastern Equatorial Africa will show. We are indebted to the same officer for having traced the Luapula, from where it issues from this lake, as far as Moero Mkata.† Equally interesting is the information brought home by Herr Reichard from the copper-country of Katanga and the kingdom of Msiri, regions hitherto known to us only from the vague reports of Portuguese traders or natives.‡

Lieut. Giraud left Dar-es-Salām on December 19th, 1882. Crossing in succession U-zaramo, Khutu, U-sagara, U-hehe, U-bena, and the Livingstone Mountains, by routes differing in many places from those followed by his predecessors, he reached the northern extremity of Lake Nyassa, and thence ascended to Kiwanda on the "Stevenson road." He then turned off towards the south-west, and travelling over a wide plain, entered U-emba, the country of the B'emba, whose chief is Ketimkuru, by far the most powerful ruler whom the explorer met with. He had only recently made war upon the Ba-biza, and claimed to have annihilated them, with the exception of a few hundred prisoners

* 'Compte-rendu,' Paris Geographical Society, 1885, p. 209; 'Mittheilungen' German African Association, iv. p. 303.

† The Society's map (March 1881) already shows the Luapula as issuing at the south-western angle of the Bangweolo.

‡ Our sketch-map is merely intended to show the routes of the French and German expeditions, and no attempt has been made to produce a compilation embodying all we know about these regions, nor to reconcile Livingstone's work with that of his recent followers. This can be done only after fuller accounts of these and of some other explorations in the same region shall have been published. On comparing Livingstone's Bangweolo with Lieut. Giraud's, we cannot help being struck by the difference in the relative positions of Kisi island and Matipa. It is quite clear that Livingstone lost his bearings when struggling through the reed marshes fringing the eastern margin of the lake. It is satisfactory, under these circumstances, to be able to state that Lieut. Giraud has found Livingstone's observed latitudes, including that for Matipa, to agree with his own observations. We may state, in parenthesis, that the Society's map gives the results of all the latitudes observed by Livingstone, including many not published in his books or papers. Kazembe's town, which Livingstone placed in long. 28° 35' E., is shifted by Lieut. Giraud 30 min. to the east. Reichard's route is laid down from the sketch in the 'Mittheilungen' of the German African Association, on the assumption of the variation amounting to 14° W. His work agrees very indifferently with the position assigned to Lake Kikonja by Commander Cameron.



whom he expected shortly to sell to a Zanzibar slave-trader. This, however, was an exaggeration, for Lieut. Giraud subsequently found numerous Ba-biza on the shores and islands of the Bangweolo, just as Dr. Livingstone had done before him. The B'emba are said to be Zulu. On reaching Zapaira Lieut. Giraud sent his caravan on to Kazembe's town, whilst proceeding himself to the shore of the lake. On the 8th of July he was able to launch his boat, and having forced a passage through a dense growth of rushes, he at length reached open water. The lake, according to the French explorer's observations, consists of a sheet of open water in the north, apparently nowhere more than 20 feet in depth, and of a vast swamp, overgrown with reeds, and swarming with antelopes. Kisi, the most elevated island, only rises to a height of 80 feet. On the eastern shore of the lake is Kirui (Livingstone's Chiribi), a peninsula densely peopled and well cultivated. At the back of it lies Matipa, the district visited by Livingstone, almost unapproachable, owing to the swamps which surround it. Bawara (Livingstone's Mpabala) a sandy peninsula or island, lies to the south of Kisi. The Luapula leaves the lake at the Kawende point. The river there is about 300 feet wide and 15 feet deep, its course being well defined between walls of gigantic rushes. Lieut. Giraud followed the river for a day, but then determined to make his way through the lagoon which spreads out at the back of it, and only after a week's arduous work did he once more emerge upon it. Its breadth was still 300 feet, but it now flowed between dry and wooded banks abounding in game, but apparently quite deserted by man. After three days of this navigation, and whilst working his way down the rapids near Kawende, the peaceable progress of the traveller was stopped by an "army," which Mere-Mere, the chief of the Ba-ussi, had sent to detain him. There then ensued a running fight, which continued as far as the rapids of Monbotuta, where Lieut. Giraud, who had only eight men with him, thought it best to surrender. He was conducted to Mirambo, the chief's residence. His reception was better than he might have expected, for the chief was anxious to trade with him, his stores of ivory having accumulated owing to a war he was then waging with Msiri of Katanga, which prevented the caravans from Bihe from visiting his country, as had been their custom in former times. It is quite clear he would have murdered his uninvited guest, if by doing so he would not have deterred caravans for ever after from visiting him. At length, however, the chief's conduct became so unbearable, that Lieut. Giraud quitted his residence in the depth of the night, when the fear of lions and leopards keeps the inhabitants of the country within doors. Making his way through the country of the hostile Wa-kisinga, and following the Luapula for some distance, he at length rejoined his caravan in the Kazembe's town. There, too, difficulties arose, which ended in a declaration of war on the part of the French explorer, and in several fights during the onward march. When

Lieut. Giraud reached Iendwe on the Tanganyika, he was thoroughly exhausted, and the hospitality extended to him by the English missionaries proved most acceptable. Much of the country which had been traversed was suffering from famine. In the country of the Ba-nasi women were collecting grasshoppers for food, and every bone thrown from the traveller's table became the object of a struggle between dogs, children, and slaves, the dogs proving generally victorious. In Itawa the bodies of men who had died of hunger were almost daily found along the road. The desertion of his carriers prevented Lieut. Giraud from continuing his explorations, and he turned his steps eastward, following the lake route by way of the Nyassa and Shire.

We now turn to the German expedition. Dr. Böhm and Herr Reichard left the Belgian station of Mpala, on the Tanganyika, on September 1st, 1888, and on September 27th they reached the Luapula, where that river is 500 feet wide, but not navigable, owing to rapids. On October 27th they crossed into the kingdom of a powerful chief, named Msiri, who had been waging a war against U-rua during the last six years, in the course of which he had advanced as far as the Kikondia Lake. He was even then "in the field," beleaguering a town named Katapena, and it was there the explorers joined him on January 20th, 1884. Katapena stands on a tributary of the Lualaba, which not far from it enters the Upemba Lake. This the travellers visited. It is said to be much larger than the Kikondia.* A small volcanic cone, Sambalulu, with a hot sulphur spring at its foot, rises near Katapena.

The explorers, anxious to get away, offered to assist Msiri in his military operations, on condition that he took Katapena by assault. This, however, the chief declined to do, and thus the days dragged on. On March 27th, Dr. Böhm died after ten days' suffering. Soon afterwards Herr Reichard was permitted to start for Katanga, on condition of his leaving behind him some of his men as hostages. He reached Katanga on May 27th, and visited two of the mines, which he found to be exceedingly rich. His attempt to trace the Lufira to its source was frustrated by the hostile attitude of the Wa-ramba, and he was compelled to turn back on June 2nd, when within three (or ten) days' journey of his goal.

When Msiri at length returned to his capital (Kimpatu in U-nkea) it became evident that he aimed at the traveller's destruction. Tired of interminable delays Herr Reichard at length started, on September 25th, with "colours flying and drums beating." A hundred and fifty natives, who sought to prevent his passage of the Lufira, were easily put to flight, but thenceforth his progress became a continuous struggle against cold, wet, and hunger. Provisions soon failed, and as game was scarce, the caravan subsisted on roots and mushrooms. Almost nightly

* The Upemba appears to be the Lokemba of the Society's map; the Kikondia is Cameron's Kikonja.

poisoned arrows were shot into the camp. The valuable collections made by Dr. Böhm had to be abandoned. At length, on November 6th, the Luapula was crossed once more, and after another long march through a hostile country the hospitable station of Mpala was reached on November 30th, 1884.

According to Herr Reichard the Lualaba is the real head-stream of the Congo. Where he saw that river, a short distance above the Upembe Lake, it is 1000 to 1500 feet wide, and the natives assert that it can be navigated as far as Manyuema. The Luapula, on the other hand, has a width of only 500 feet, and forms numerous rapids in its course through the Mitumba Mountains. The Lufira, where crossed, was only 150 to 200 feet wide. It forms two waterfalls, one in the salt-plain of Muacha, and another, Juo, at the head of the gorge through the Viano mountains. The Juo falls are 80 feet high, the breadth of the river being 330 feet.

GEOGRAPHICAL NOTES.

Progress of Mr. H. O. Forbes's Expedition.—In a letter dated June 30th, from Batavia, Mr. Forbes informs us that he arrived at that place from England on May 8th, just in time to catch a steamer going to Amboina, where the chief preparations for his expedition had to be made, viz. the engagement of men for the land journey in New Guinea. He was fortunate in securing the services of four of his former hunters, besides twenty carriers, a number which he hopes to increase to twenty-five. He had accepted the offer of a contribution of 500*l.* from the Geographical Society of Australasia, together with its conditions, which are to give them a full report of his journey and second sets of his collections. Mr. William Mackinnon, with his usual public spirit and liberality, had granted free passages in the British India Co.'s steamers for him and his men to Thursday Island; but it was doubtful if General Scratchley could be at Thursday Island in time to give the expedition a passage to Port Moresby. Mr. Forbes would leave Batavia in the steamer for Thursday Island about the 13th of July. He adds that if an opportunity offers for Dyke-Acland Bay, on the north-eastern coast of New Guinea, he would be inclined to make that his starting-point for the interior, in preference to the southern coast, on account of its being freer from the terrible disease *beri-beri*, which attacks and disables all the natives, Amboinese and Javanese as well as the indigenes, in the lower lands of the southern side of the island.

The Summer Quarters of the Afghan Boundary Commission.—The recent movements of the Afghan Boundary Commission in their endeavours to find suitable summer quarters, are described in a letter from

the special correspondent of the *Allahabad Pioneer*, dated 1st July. He says a move to more sheltered quarters became necessary after a hurricane which nearly tore the tents to ribbons at Sinjas on the 16th and 17th of June. The Mission accordingly made for the Kumkh valley, lying north-east of Herat. Kumkh itself is a large straggling village inhabited by Afghans, Jamshidis, and Tajiks, and belonging for the most part to the Shaikh-ul-Islam, a leading divine in the Herat district. The Jamshidis here differ both in dress and habits from their wilder and more independent brethren of Kushk and Bala Murghab, and (a perhaps not unnatural consequence of settled life and civilisation) were more sparing of their salutations to the English. Crossing the Kumkh valley the Mission took up their quarters in the Taghu Robat, a sort of hollow on the main range between the Armalik and Zaimast kotals on the south, and the Kashka kotal on the north. An excursion was made to Naratu, a curious old fort 12 miles off, of a remarkably strong and inaccessible character, but of which it was found impossible to discover any authentic history. The great attraction of the place, however, is the ziarat or shrine of Imam Ali Asgar, the grandson of Hazrat Ali. Thousands of pilgrims repair hither and leave rude offerings. The situation of the English camp at Taghu Robat is described by the correspondent as excellent. It is between 5000 and 6000 feet above sea-level, in a most perfect climate, clear, cool, dry, and unsurpassed by an Indian hill station. Fogs and rains are both conspicuous by their absence, and the place is sheltered from wind. For getting news the position is good, being about equidistant from Herat and Bala Murghab, and within easy reach of Kushk and Kala-i-Nau, the Hazara chief of which latter place is very friendly, having recently asked Colonel Ridgeway to take up his residence among them. Captain Gore and Dr. Aitchison were reported to be in the neighbourhood of Meshed; Dr. Wein was with Mr. Finn on his tour along the Perso-Russian frontier; Captain Maitland and the Hon. M. G. Talbot were shortly leaving for Obek, and Captains Yate and Peacocke for Kala-i-Nau with the hope of exploring and surveying some of the hitherto unknown Firuzkoti and Taimuni country.

The Lava Fields of Corea.—Mr. Carles made in April last another important journey of exploration in Corea, with the object chiefly of examining the Ph्योंဂ Kang gold-washings, 85 miles north-east from Söul in the direction of Gensan. It is stated that the number of gold-seekers at these mines is 3000. Mr. Carles and his companion, Mr. E. L. B. Allen, did most of the journey on foot, without escort, and met with no obstacles; indeed they were cordially received by the people everywhere. After getting beyond, on the first day's march, the granite mountains which surround Söul, Mr. Carles found himself in a country essentially volcanic in character. The mountains were all of igneous rock, but among them were no cones to indicate the presence of

volcanic action, of which the first signs were evident a mile below Chhön-mal (37 miles from Söul) on crossing a river some 80 yards wide, which flows westwards to join the Im-jin-gang, the large tributary of the Han river. Beyond the river was a level plain, about 120 feet above the river, extending as far as So-rai-yol, a distance of 10 miles, and apparently about three to four miles in width. On the east and west of it are two rivers, flanked by precipitous banks, and uniting at the south-western corner of the plain. On the 22nd April, two days after leaving Söul, the travellers ascended a stream for about 10 miles, on the east of which is a fine range of mountains known as Po-kyei-san, but to the west are rounded hills of no great height. On the afternoon of the same day, after ascending 110 feet from the village of Yong-dam (68 miles from Söul) and passing between large blocks of lava strewn by the roadside, Mr. Carles entered a vast plain stretching far to the north. The road skirted its extremity, passed near the town of Chhöl-wön, and then struck into the field of lava "which in extent appears to exceed even that of the largest in Iceland." Between Chhöl-wön and Pai-namou-tjang (94 miles from Söul), a distance of about 40 miles, there is only one break in the bed of lava; this break Mr. Carles is inclined to attribute to the action of the stream which flows near Phyöng Kang, basing his opinion on the appearance of the banks on either side (which, however, are in places nearly three miles apart), the uniform depth of the lava (100 to 140 feet), and the continuous and gradual ascent to the north. The plain could be seen stretching 13 miles farther, up to the divide of the eastern and western watersheds. About 30 miles north of this divide Mr. Carles last year left a similar plain stretching from An-byön to Ko-san, but nearly 1000 feet below the level of Pai-namou-tjang. "There are thus," he states, "three great oval fields of lava passing almost in a straight line through the mountain chain which runs from the north to the south of Corea, at a height of about 1500 feet above the sea near the divide, and of 500 feet on the lower levels. There is also another plain about 4 miles wide and 12 miles long to the east of the Keum-Süng district, the direction of which is not so well defined, but in which the depth of lava is apparently even greater than that in the others." In two places, near Chhöl-wön and the town of Phyöng Kang, there is a little trap-rock, but though there are many cone-shaped hills, no crater is visible in any direction to account for the enormous mass of lava. Mr. Carles' description reminds us of Mr. Archibald Geikie's account of what he saw in some of the great lava-fields of Western America, fields of such enormous extent, and also so destitute of crater, as to suggest to his trained eye the idea that at some remote period, when volcanic activity was much greater than it is now, the molten lava must have welled up from extensive fissures, and simply spread itself over the ground in all directions. This may be the explanation of the Korean lava-beds;

but evidently there is a fine field for an experienced geologist here, like Professor Milne of Tokio, who might do worse than spend his next summer holiday in solving so interesting a problem. Oats, beans, millet, reeds, and in sheltered places hemp and potatoes, are the only crops that grow on the plateau, which the sparse population clears of reeds by means of fire. Mr. Carles visited the great gold-washings at Ka-neng-kai, a village six miles west of Pai-namou-tjang, where about 270 men are said to be employed. Trenches were dug in a bank of shingle parallel with the river side. The results seemed uniform, and far superior to those of any other place visited by Mr. Carles in Corea. The mountains on the west bank of the stream are of "some igneous rock," stained as by iron, through which there run occasional seams of quartz, apparently of considerable extent. The country seems to Mr. Carles to be more promising than elsewhere, and to be worth the visit of an experienced miner. He visited, in the plain of Chhöl-wôn, the remains of the capital of a princelet in the time of the old Sinra dynasty (which came to an end in the 10th century), consisting of a portion of a fortress, palace, &c. Chhöl-wôn (pronounced Chhörön) is the largest town near the route taken by the party, numbering over 2000 houses; but the country is thinly populated, and they saw few villages of over 40 houses.

Trigonometrical Survey of the Transvaal.—Mr. H. C. Schunke, Government Surveyor of Natal, has been appointed, through Dr. Gill, Astronomer Royal at the Cape, to the direction of the Trigonometrical Survey of the Transvaal State, which is to be carried out in accordance with the decision of the Volksraad, and is to connect with the geodetic surveys of Cape Colony and Natal. The chain of principal triangles is to extend from Newcastle (Natal) to the Limpopo, keeping close to the 30th meridian; thence it will extend south-west along the western side of the State to the west boundary of Griqualand. A chain of triangles will also run from Middleburg over Pretoria to Marico. The longitude of Pretoria is to be determined by the electro-telegraphic method, directly from the Cape Observatory. The instruments for the astronomical part of the work will be kindly lent by the Cape Observatory.

Further News from the Ba-rotse Country.—Letters under date April 16th, 1885, have been received from M. Jeanmairat from Leshoma, south of the river Zambesi. M. Coillard, accompanied by M. Middleton, had accomplished his journey up the valley of the Zambesi to visit Akufuna, the king of the Ba-rotse, and had been received with great kindness, obtaining leave to settle at Sefula, a healthy situation in the vicinity of the residence of the king and queen. M. Coillard had returned to Leshoma to arrange for the immediate move forward of the *personnel* of the mission, consisting of his wife and niece, and M. Jeanmairat with

the native catechists. The authority of King Akufuna is not very great; his minister Mataga appears to be master of everything, but he has had several rebellions to put down. On the whole the prospect is not very bright.

The Congo.—In the 'Baptist Missionary Herald' for August 1st will be found a long communication from the Rev. George Grenfell on a journey which he made in the end of 1884 and beginning of 1885 up the Congo from Stanley Pool to Stanley Falls. Mr. Grenfell, while devoting his communication mainly to the missionary aspects of the river, gives many notes on the geography, the condition of the stations, and the natives met with at various points away from the stations. His notes on his first ascent of the Mobangi river are of special interest, and will be found to supplement to some extent those already given in the 'Proceedings.' Mr. Grenfell met Tippu Tib at Stanley Falls, and states that the Arab slaver is evidently preparing for a permanent occupation of the Falls. "He is making large plantations, talks of building a stone house, and says he is expecting 2000 more men."

The Comoros.—In the 'Comptes Rendus' of the Paris Academy of Sciences, July 20, is a paper by MM. A. Milne-Edwards and E. Oustalet on the fauna of Great Comoro. The observations are based on the collections made by M. Humblot during a recent sojourn of several months on the island, the object being to discover what have been the past geographical relations of the island group. There is no indigenous mammal in Comoro, all those found there, according to the authors, having been imported. M. Humblot found thirty-four species of birds; and after a study of all the collections MM. Milne-Edwards and Oustalet came to the conclusion that Great Comoro is not a dependency of Madagascar, that it has never been attached to that island, and that its fauna has been imported from neighbouring regions.

The highest Mountain in Sweden.—It has hitherto always been believed that the highest mountain in Sweden was Sulitjelma, on the Norwegian frontier, in lat $67\frac{1}{2}^{\circ}$ N., and belonging as much to Norway as to Sweden, the height of which is a little more than 6000 feet. Last year, however, the topographical surveyor of the province of Norrland found that another mountain, viz. Sarjektjåkko, in Swedish Lapland, was quite 1000 feet higher than Sulitjelma. But it has now been discovered that neither is this mountain the highest in Sweden: Dr. Svenonius, well-known for his explorations in Lapland, has stated that the honour belongs to Kebnekaisse, also in that province, the height of which has been ascertained to be 7300 feet above the level of the sea.

Subsidence of one of the Færö Islands.—According to the Færö newspaper *Dimmalætting*, *Amtstidende for Færøerne*, No. 12, 1885, the well-known rocky islet Munken, which lies $3\frac{1}{2}$ miles south of Sumbö, and formerly rose to a height of 70 feet above the sea, has completely sub-

aided. It was reported last year that a considerable portion had crumbled away, but it is now no higher than the low surrounding rocks, so that even in tolerably fine weather the sea breaks over and covers it. The shoal water about the islet causes such dangerous currents, that the seamen of olden times believed there was a Malström there, and it is therefore very unfortunate that this rock, which served as a sea mark, will no longer warn navigators of their approach to danger. In his book entitled 'Færøernis og Færøeske Indbyggeris Beskrivelse,' published in 1673, Pastor Lucas Jacobsøn Debes says, "Southward of Suderøe is a Maleström: in the middle of the Maleström stands a high rock called Sumbö Munck; with this rock are six skerries which stand slightly above the water; on which when one places a compass it flies round about, and is so injured that it is afterwards useless." In Pastor Jörgen Landt's 'Forsøg til en Beskrivelse over Færøerne,' published in 1800, the islet is described thus: "One mile (four English nautical miles) southward of Sundbøe, or fully three-quarters of a mile (three English nautical miles) from the southernmost point of the island, lies Munken, a 12 fathom high mass of rock, about which to a distance of a mile (four English) runs a dangerous current, caused by the numerous surrounding rocks above and below water. From seaward the rock presents the appearance of a ship under full sail; but from the land side it has a tolerably good resemblance to the figure of a monk; the neck is a hard red clay, but the head and body consist of a blackish grey rock, which looks like an unformed basalt; on the top of the rock are some stones, and one of them is so large that it can even be seen from the land." * Under date of 28th May, 1885, Minister of Marine N. F. Ravn has officially notified that Munken has fallen down, and thus one of the most remarkable objects in the Færø group, which has been admired by thousands of seamen who have sailed past it, and which plays so conspicuous a part in geographical literature, especially with reference to the Zeni narrative, has now shared the fate of the Gunnbjörn skerries, and disappeared from the face of the ocean.

Cumberland Sound and Davis Straits.—In the latter half of 1883 Dr. F. Boase visited the German Polar Station in Cumberland Sound, and made several excursions in the neighbouring region and along the coast. The results are briefly told by him in a paper in Nos. 5 and 6 of the 'Verhandlungen' of the Berlin Geographical Society for this year, accompanied by a map, in which many important corrections are made on the existing Admiralty charts of these coasts.

Venezuela.—In the 'Mitteilungen' of the Hamburg Geographical Society for 1884, just issued, are two communications from Dr. W. Sievers on his travels in Venezuela. Dr. Sievers gives some interesting details as to the results still observable of the great earthquake which shook the

* These extracts are as nearly as possible literally translated.

north coast of South America on March 26, 1812, and describes a journey he made from Carácas to Puerto Cabello in November and December 1884. The special interest of these communications is that Dr. Sievers was a pupil of Professors Richthofen and Wagner, and was trained as a geographer with a view to geographical explorations. His notes on his journey are a good example of what comprehensive geographical observation ought to be, and, moreover, furnish useful information on the country he passed through and the towns he visited.

Mayor Island, New Zealand.—A description of this island by Mr. E. C. Gold-Smith, will be found in the 'Transactions' of the New Zealand Institute for 1884 (p. 417). The island is situated in the Bay of Plenty, 23 miles north of Tauranga Harbour, and about 16 miles from the nearest point of the north island. The island is small, only 3154 acres in extent, but is of much geological interest. The highest point, Opuahau, is 1274 feet above sea-level. The formation is volcanic; the native name is Tuhua, the Maori name for obsidian, of which, with basalt, the island principally consists. The coast is marked by magnificent caves; there are hot springs in the island, and a crater five miles in circumference. Mr. Gold-Smith gives a detailed description from his own careful survey.

Mr. Glaisher's Journey on the Berbice River and Wieroonie Creek.—An account of Mr. E. H. Glaisher's journey on the Berbice river and Wieroonie creek has recently appeared in pamphlet form. The journey was made during the months of October and November, 1884, chiefly for the following objects, viz.: "To obtain information of the fauna in the neighbourhood of the falls, and to make journeys into the interior of the country away from the river banks, for the purpose of gaining some fresh knowledge about this part of the colony, which at present is almost a *terra incognita*." Mr. Glaisher left Georgetown on the 6th October, and on arriving at "Plantation Friendship," the following day started up the river, the banks of which, between Maria Henrietta and Koomaka Downs, were found to be thickly populated. Many creeks were passed, among which may be mentioned the Pawye, which has a branch called the Psari creek, and the Kibiri-biri creek. The river in places is described as being very narrow, and in one place islands became common. After passing the third island the river was found to flow in a north-easterly direction, the view being bounded on the east by a low ridge of hills which trend apparently from north to south, and which Mr. Glaisher inferred separated the Corentyn from the Berbice watershed. Farther on, the river opens out into wide lake-like expanses of water, the land becoming very high, and some well-wooded ranges of hills were seen stretching far inland. The first rapids consisted, at this season, of a series of small falls, which are about 50 yards wide and 100 yards long. The following species of forest trees were seen by Mr. Glaisher on the upper part of the river;—unfortunately he gives only the local names—greenheart, wallaba, kakerally, bullet-tree, paddle-wood, mora, morabally, locust, dakamarballi, silverballi, etaballi, tonka-bean, huboballi, monkey-pot, &c. The Wieroonie creek is described by Mr. Glaisher as emptying itself into the main river at a place where there is a large bend. Opposite to its mouth, which is about 30 yards wide, is an extensive shallow bank caused by the large deposit of sand brought down by its waters. This creek was ascended by Mr. Glaisher to within a day's journey of the Demerara river, the greater part of its course winding through large swamps.

Aerial Formations of Soil.—M. Violet d'Aouest read a note at a late meeting of the Geographical Society of Paris on aerial formations on the land. Referring to Richthofen's discovery of a vast formation of this character, the loess in China, he described "meteoric formations" which he had himself examined in Mexico. In 1857 he made a communication on this subject to the Society; he found on the flanks of the most elevated mountains argillaceous deposits, which could not be attributed to decomposition of the rocks *in situ*, or to the alluvion deposited by rivers, or by the rain. He referred them, after investigation, to atmospheric currents. In the day the winds raise the particles from the plains and carry them at night to the hills, depositing them there. In course of time these deposits had reached a thickness of thirty to fifty and in places a hundred metres. The upper part, which was generally finer, stopped at the limit of herbaceous vegetation, for beyond this there was nothing to retain the particles, which were carried down by rains, snow or winds to the lower part. Fifteen years later he heard of Richthofen's publication on the subject, and Colonel Prejevalsky during his late journeys in Tibet states that analogous aerial deposits are now being formed under the influence of powerful winds which prevail at these altitudes. Subsequently M. d'Aouest met Baron Richthofen and discussed the subject with him, when the latter stated that these formations exist in Europe, adding that it was singular how men, unknown to and far removed from each other, could be led to make the same discoveries in wholly different regions. M. d'Aouest now intends publishing a translation of Richthofen's monograph on the subject, with a supplement of his own containing a number of important documents which he has collected on these deposits. He thinks he will be able to explain loess and argillaceous deposits, the origin of which has hitherto been regarded as problematical, by this theory.

Atlantic Currents.—We received in the course of the past month two communications relating to the picking-up of bottles with enclosed memoranda, cast overboard by enterprising ship captains with a view to testing the direction of what may be called the secondary currents of the Atlantic. One of the communications is from the German Consul at Fayal in the Azores, and is to the effect that one day about the beginning of July last a bottle was picked up "near the coast of the island of Pico," N. lat. $38^{\circ} 26'$, W. long. $28^{\circ} 35'$, the contained paper stating that it had been thrown overboard from the Hamburg steamship *Bohemia* on August 23rd, 1884, in N. lat. $42^{\circ} 4'$, W. long. $52^{\circ} 12'$. The inference to be drawn from this case is that the southerly current thrown off by the Gulf Stream in this part of the Atlantic is one of extreme slowness. The other communication is from Herr H. Wolff, of Grand Popo, West Africa. Writing on the 30th of May last, he informs us that a negro in his employ found on the beach near Grand Popo a bottle, the enclosed papers of which state it was thrown overboard from the

ship *Patriarch* (from Newcastle, New South Wales, bound for London) on the 11th December, 1884, in N. lat. $2^{\circ} 46'$, W. long. $22^{\circ} 3'$. This point is near the southern edge of the Guinea current, which thus appears to have taken five months to carry the bottle some 1200 geographical miles from west to east.

New Geographical Journal.—We have received the first two numbers of the '*Revista de Geografia Comercial*,' the organ of the Spanish Society of Commercial Geography. It is almost entirely devoted to the commercial interests of Spain abroad.

Obituary.

Lord Houghton.—In common with many other public institutions our Society has sustained a loss which will be sensibly felt in the death of this eminent and highly-gifted peer and man of letters, who died suddenly at Vichy on the 11th of August. Baron Houghton (the Right Hon. Richard Monckton Milnes, D.C.L., F.R.S.), was born June 19th, 1809, the only son of Robert Pemberton Milnes, of Fryston Hall, Bawtry Hall, and Great Houghton, Yorkshire, by the Hon. Henrietta Maria, daughter of Robert, fifth Viscount Galway. He was educated at Cambridge, and sat in Parliament for Pontefract from 1837 to 1863, when he was raised to the peerage. Of his literary efforts, well known doubtless to our readers, and his political and distinguished social career, we need not here speak. Lord Houghton had been a member of our Society since 1853, and served as one of the Trustees since 1859. As a member of the Council his advice was always listened to with respect, and on one or two occasions was of the highest practical value. His face was familiar at the evening meetings of the Society; and on important public occasions, and especially at the Society's Anniversary dinners, he was often a prominent speaker, always sure to have something to say worth listening to, said with an art and a finish rare in public speakers. Lord Houghton officially represented the Society on an occasion of world-wide importance, the opening of the Suez Canal in 1869. His report of his mission, which will be found in vol. xiv. of the '*Proceedings*,' p. 88, may even now be read with interest, containing as it does a bright and graphic account of the origin and progress of the Canal as well as of the opening ceremony. Lord Houghton will be missed within the limits of our Society, as he certainly will be in society at large.

Sir Moses Montefiore, Bart., whose death took place on July 28th, at the age of more than 100 years (he was born October 14th, 1784), was one of the original members of our Society, as will be seen from the list (p. 29) given by Mr. Markham in his '*Fifty Years' Work of the Royal Geographical Society*.' Sir Moses in his earlier years had been a considerable traveller, having visited, among other countries, mainly on missions connected with his Hebrew co-religionists, Palestine and Morocco.

NEW GEOGRAPHICAL PUBLICATIONS.

(By J. SCOTT KELLIE, *Librarian R.G.S.*)

EUROPE.

Groome, Francis H.—Ordnance Gazetteer of Scotland : A Survey of Scottish Topography, Statistical, Biographical and Historical. 3 vols. Vol. I. pp. 584. Vol. II. pp. 568. Vol. III. pp. 503 and 134. Edinburgh, Thomas C. Jack. Price 3*l*.

This very excellent Gazetteer takes its special title from the fact that nearly every article is referred to its place in the sheets of the Ordnance Map of Scotland. The work is of the most comprehensive and minute character, including nearly every place, we should think, that has a name, from country seats up to cities and counties. Under each head minute details of topography are given ; all associations, historical, antiquarian, architectural, legendary, literary, scenic, referred to at length ; information, descriptive and statistical, concerning industries and manufactures of all kinds, administrative, civil and ecclesiastical, education, means of communication, given with useful fulness. Where the subject requires it, the climate, natural history, geology, and economic products are treated of. Under each county we have lists, not only of all cities, towns, and villages, but even of mansions. Appended to each important article is a full list of authorities. Most of the articles seem to us to have been written or revised on the spot, the only method by which accuracy can be secured. In some cases, however, we have noticed statements that could not have been made had this plan been invariably adopted. As usual in works of this class there is a want of proportion between the beginning and the end. In some of the longer articles, the conclusion seems somewhat hurried up, as in Edinburgh ; and in the last volume the treatment does not seem so full as in the other two volumes. At the end, instead of at the beginning where it should have been, we find a General Survey of the whole country, occupying 130 pages, and divided into the following sections :—Position, boundaries, extent, and area ; Leading physical features ; Mountains, lakes, rivers and islands ; Geology ; Meteorology ; Agriculture ; Zoology ; Botany ; Fisheries ; Deer forests and Game moors ; Industries and Commerce ; Communications, telegraphs, &c. ; Population ; Education ; Administration ; History ; Ecclesiastical History ; Gaelic language and literature. The principal authors of this General Survey are Mr. H. A. Webster (who writes several of the sections with his usual care and method), Prof. J. Geikie, Mr. A. Buchan, Mr. B. N. Peach, Mr. J. G. Bertram, Mr. James Landells, Mr. John Gibson. There are a few excellent sectional maps, by Bartholomew ; but there are also a number of very poor and antiquated County maps, quite unworthy of such a work, and deserving only a place in an antiquarian museum. There are also a large number of steel- engravings and woodcuts.

Levasseur, Émile.—La Statistique Officielle en France. Organisation, travaux et publications des Services de Statistique des différents Ministères. Précédée d'un Aperçu historique. Nancy, Berger-Levrault et Cie., 1885. Small folio, pp. 63.

Mohn, [Professor] H.—Die Strömungen des europäischen Nordmeeres. Mit 10 Durchschnitten und 13 Karten auf 4 Tafeln. Ergänzungsheft No. 79 zu 'Petermann's Mittheilungen.' Gotha, Perthes, 1885, pp. 20. Price 2 Mark 60 Pf.

Professor Mohn was the scientific chief of the Norwegian North Sea Expedition, which for a succession of recent summers made a very thorough exploration of the Ocean between Scotland and Iceland. He here summarises the results under the following heads :—I. Pressure in the Depths. II. Distribution of Specific Gravity in the Ocean. III. Distribution of Density. IV. Atmospheric Pressure. V. Changes of Surface produced by Winds. VI. Surface Currents. VII. Movement of the Waters below the Surface. VIII. Résumé and Conclusions. The charts are specially intended to illustrate the various aspects treated of.

Thoroddsen, Th.—Eine Lavawüste im Innern Islands. 'Petermann's Mittheilungen,' viii., 1885. Gotha, Perthes: pp. 285–294.

The lava desert here referred to is that which lies immediately to the north of Vatna Jökull, and is with justice designated by Herr Thoroddsen the greatest desert of the kind in Europe. He made a very thorough exploration of this region in the summer of 1884, amid many difficulties, owing partly to the almost absolute want of vegetation. Herr Thoroddsen here gives the first instalment of a detailed narrative of three journeys, the results of which are of much interest to science. The accompanying map is on the scale of 1:800,000.

ASIA.

Bonvalot, Gabriel.—En Asie Centrale. Du Kohistan à la Caspienne. Paris, Plon, 1885: pp. [2] and 300. Price 4s. (*Dulau.*)

This is the continuation of the work noticed in the 'Proceedings,' vol. vi. p. 424, describing the journeys of MM. Bonvalot and Capus in Central Asia. The present volume relates to Samarkand and the Famine steppe; Kohistan (three chapters); the valley of Choktal; from Choktal to Bokhara; on the Amu-Darya; Khiva; and the Ust-Urt Desert (two chapters). There are several illustrations; and the map, as in the former volume, is from Burnaby's 'Ride to Khiva.'

Rhodes, [Pere] A. de.—Voyages et Missions du Père A. de Rhodes, S.J., en la Chine et autres royaumes de l'Orient, avec son retour en Europe par la Perse et l'Arménie. Nouvelle édition, conformée à la première de 1653, annotée par le Père H. Gourdin, de la même compagnie, et ornée d'une carte de tous les voyages de l'auteur. Société de Saint-Augustin, Desclée, De Brouwer et Cie, Lille, 1884: pp. viii., iii., and 5–366. (*Dulau.*)

This is a well-edited and well-printed edition of the voyages of this old missionary traveller, of which the Society possesses the Milan edition (Italian) of 1651. There is a brief introduction on the life and work of Father Rhodes, and some interesting bibliographical information.

Schmidt, Franz Max.—Über Rubruks Reise von 1253–1255. 'Zeitschrift der Gesellschaft für Erdkunde zu Berlin,' No. 117, 1885, pp. 161–253.

This is a very thorough critical study of the journey of Rubruquis (correctly Rubruk according to the author) into Central Asia, and may be regarded as a valuable contribution to historical geography. It is accompanied by a map of Central Asia on the scale of 1:10,000,000.

AFRICA.

[Africa.]—Mittheilungen der Afrikanischen Gesellschaft in Deutschland. Band iv., Hefte 3, 4, 5. Berlin, Reimer, 1884–5.

These three numbers are largely occupied with communications concerning the Pogge-Wissmann expedition, and mainly with the journeys of Dr. Pogge after parting with Wissmann, and his observations on native character and customs. In Heft 3 is the third sheet of the route map from Malanje to Lake Tanganyika, embracing the stretch between Muchimang and Bene Tanganyika (1:750,000); and in Heft 4, Pogge's route map from Mukenge to the mouth of the Lubria (1:750,000). There are also details concerning Pogge's death. There are also reports from the East African Expedition; Reichard's journey from Karema to Kapampa and through Marunga to Mpala, and his journey to Urua and Katanga (1883–4). There are also communications from the Expedition to the Lower Congo under the late Lieutenant Schulze, 1884–5; and from Herr G. A. Krause, a few notes of his short journey in the summer of 1884 in the neighbourhood of Lagos.

[**Danakil.**].—Notizie sui Danakil, e più specialmente su quelle di Assab. Raccolta da Francesco Scaramucci e Enrico H. Giglioli. Estratto dall' Archivio per l'Antropologia e la Etnologia. Vol. xiv. Fasc. 1^o, 1884, pp. 30.

This relates mainly to the inhabitants of Danakil, their mental and moral characteristics.

Fief, J. Du.—La Question du Congo depuis son origine jusqu'aujourd'hui. Explorations. Association du Congo. Etat Independant du Congo. Conférence de Berlin. Géographie du Bassin du Congo. Avec une Carte de l'Afrique Centrale (1 : 10,000,000). Bruxelles, Secrétariat de la Société Royale Belge de Géographie, 1885 : pp. 79.

Fischer, [Dr.] G. A.—Mehr Licht im dunkeln Weltteil. Betrachtungen über die Kolonisation des tropischen Afrika, unter besonderer Berücksichtigung des Sansibar-Gebiets. Hamburg, Friederichsen : pp. 130. Price 2s. 6d.

Dr. Fischer of Zanzibar, well known for his exploration of Masai-land, seeks in this *brochure* to give some solid information as to the resources and possibilities of the continent. The work is divided into seven sections:—1. Trade Conditions; 2. Agricultural Capabilities of the African Soil; 3. Use of Europeans in Africa; 4. Modes of Life, and Diseases; 5. Negroes and Trade; 6. The English Anti-slavery operations and Christian Missions; 7. Slavery; 8. The Sultan of Zanzibar; 9. Training of Negroes to labour, and the results; 10. Character and Customs of the Negroes; 11. Europeans in contact with the native tribes; 12. The German East African Society; 13. African Animals in the service of man; 14. The Congo State; 15. German Africa.

Franzöj, Augusto.—Continente Nero. Note di Viaggio. Torino, Roux e Favale, 1885. (*Dulav.*) Pp. xix. and 350.

Signor Franzöj made the journey recorded in this volume in 1883. The notes are loosely put together, and the narrative is somewhat dramatic in style. Signor Franzöj proceeded into the Egyptian Sudan from Massowah, to Kassala, southwards to Gadaref and Gondar to Abyssinia, skirting the east coast of Lake Tsaná; then east and south through the Nollo-Galla Country to Shoa, and south-west to Kaffa. Returning he struck for some distance into Galla-Land, and then proceeded north-east to Assab. A very small map accompanies the volume.

Moullé, M. A.—Mémoire sur la Géologie Générale et sur les Mines de Diamants de l'Afrique du Sud. Paris, Dunod, 1885 : pp. 156.

AMERICA.

[**America, United States.**].—Department of the Interior. United States Geological Survey, J. W. Powell, Director. Monographs of the United States Geological Survey. Vol. VI. Contributions to the Knowledge of the Older Mesozoic Flora of Virginia, by William Morris Fontaine. Washington, Government Printing Office, 1883. 4to., plates, pp. xi. and 144.

This volume is divided into three parts as follow:—Part I. The Geology of the Mesozoic Areas. Part II. The Fossil Flora. Part III. The Older Mesozoic Flora of North Carolina.

Leclercq, Jules.—Voyage au Mexique, de New-York à Vera-Cruz, en suivant les routes de Terre. Ouvrage contenant 36 gravures et 1 carte. Paris, Hachette et Cie., 1885 : pp. 446. Price 4 francs.

M. Leclercq, who is President of the Belgian Geographical Society, made the journey recorded in this volume in the year 1883. From New York to St. Louis, and south through Texas, he traversed the centre of Mexico, touching at Monterey, Saltillo, St. Louis, Potosi, Guanajuato, Queretaro, and Mexico, where, of course, he made a considerable stay. He left the country by Vera Cruz. M. Leclercq has nothing particularly new to tell, but it is always useful

to have an account of the present condition of things in rarely visited regions from observers so trustworthy as he is. One of the most interesting chapters of this book is that describing his visit to the volcanic mountain Jorullo. The map, extending from 32° to 16° N., is on the scale of 1:5,000,000.

[Uruguay].—*La República Oriental del Uruguay. Obra de Estadística escrita con el fin de hazer conocer bajo todos sus aspectos principales el país, y las incomparables ventajas que ofrece a la emigración europea. Por Ramon Lopez Lomba, oficial mayor del Ministerio de Justicia, Culto é Instrucción Pública. Montevideo, 1884: pp. 37.*

This is a series of data, mainly statistical, of the various aspects of Uruguay, compiled, as the title states, to prove the "incomparable advantages" of the Republic for European immigrants. Appended is a map, on a mean scale of 1:1,806,105, with inset chart of Montevideo Bay, plan of Montevideo City, and various views and portraits.

AUSTRALASIA.

[Australia].—*The Year-Book of Australia for 1885. George Robertson & Co.; London, Trübner & Co. 8vo., pp. 774, maps. Price 5s.*

This edition, in which the work reaches its fourth year of publication with the present volume, contains 102 pages in excess of last year. Great care has been bestowed upon this work by the editor, to make it as accurate as possible as a book of reference.

It contains a great deal of statistical and general information relating to Australia, amongst which may be noticed—a Record of the Events relating to the past year, Postal and Telegraphic information, Railways, Land Laws of Australia, Administrative and Legislative as well as Legal information: one section of the volume being devoted to the subject of Viticulture in Australia, which is evidently destined to become one of the leading industries of the Colony. The articles entitled "The Churches in Australia" and "Education in Australia" contain in them a series of facts likely to prove of value to future historians of Australia.

Bastian, Adolf.—*Der Papua des dunkeln Inselreichs im Lichte psychologischer Forschung. Berlin, Wildmansche Buchhandlung, 1885: pp. xx. and 368. Price 8s. 6d. (Dulau.)*

This is an elaborate study mainly of the peoples of the Australasian and New Guinea regions in respect of their beliefs and superstitions, social and sexual relations, customs in connection with the various stages in the life of the individual—birth, puberty, marriage, and death, and the feelings and sympathies which, in greater or less degree, are common to all humanity. Many other civilised peoples are referred to, Africans and American Indians. It is really a great collection of facts connected with the life of the various peoples referred to, facts valuable to the student of humanity, all the more that they are brought together into a form capable of comparison.

GENERAL.

Encyclopædia Britannica, The: A Dictionary of Arts, Sciences, and General Literature. Ninth Edition. Vol. XIX. Edinburgh, A. & C. Black, 1885, pp. 886.

This great undertaking is approaching its conclusion. The present volume extends to Proxy. The articles of geographical interest are all up to a high standard, being as a rule written by men recognised as authorities in their own particular departments. In the present volume, for instance, we have articles on Poland, by W. R. Morfill; Polar Regions, by Clements R. Markham; Portugal, by H. Morse Stephens and H. B. Briggs; while many of the smaller articles are also written by authors who have made a special study of their subjects. Going back to the previous three volumes, we find in vol. xvi., Mexico, by D. E. B. Tylor and Prof. Keane; Montreal, by Prof. D. Wilson;

Morocco, by H. A. Webster; Moscow, by M. Krapotkine. In vol. xvii. the article on Murchison is by Mr. Archibald Geikie; Newfoundland, by Rev. M. Harvey; New Guinea, by Coutts Trotter; New Zealand, by W. Gisborne; Nile, by H. A. Webster; North Sea, by John Murray; Norway, by Prof. Mohn, A. Gibson, and E. W. Gosse. In vol. xviii. we have Pacific Ocean, by John Murray; Persia, by various hands, the history and geography being by General Sir Frederick Goldsmid; Peru, by C. R. Markham; Philippine Islands, by H. A. Webster. Most of the American geographical articles are written by Americans. The numerous maps and plans by W. & A. K. Johnston are satisfactory. The work, we should say, is presented to the Society's Library by the publishers.

Fleming, Sandford [C.E., C.M.G].—Universal or Cosmic Time, by Sandford Fleming; together with other communications and reports in the possession of the Canadian Institute, respecting the movement for reforming the Time System of the World, and establishing a Prime Meridian common to all nations. Toronto, Copp, Clark and Co., 1885: pp. vi., 101.

This forms Fasciculus No. 2, of third series, vol. iii., of the 'Proceedings' of the Canadian Institute.

Laërne, C. F. Van Delden.—Brazil and Java. Report on Coffee-Culture in America, Asia, and Africa, to H.E. the Minister of the Colonies. Plates, maps, and diagrams. London, Allen & Co., 1885: pp. xii. and 637. Price 21s.

This is an English edition of the work noticed in last number of the 'Proceedings,' and will render accessible to a much larger public a mass of information of great scientific and industrial value. Much space is devoted to the geography, physical and political, history, social, agricultural, and industrial conditions, trade and banking, of Brazil, besides the special subject of coffee culture. Besides the very full and useful information as to coffee in Java and Brazil, many details are given on coffee industry and trade in other countries in which the culture is carried on. The work is one of real importance in what is sometimes known as industrial geography. The names in the two maps have been anglicised for this edition.

NEW MAPS.

(By J. COLES, *Map Curator R.G.S.*)

WORLD.

World.—Photolithographed Copy of Gerard Mercator's Mapamundi of 1538, from an original engraving in the library of the American Geographical Society. New York. Prepared under the direction of Dr. J. van Raemdonck.

It may not be considered out of place to give a short account of the original of this map, a faithful copy of which Dr. van Raemdonck has, after several attempts, succeeded in producing, and which he has been good enough to present to this Society, with the permission of the American Geographical Society, in whose possession the original is to be found.

The projection on which this map is drawn is the so-called double cordiform, a method which, it is generally believed, was first introduced by Oronce Fine, a French mathematician, and published in Paris, 1532, to illustrate a collection of travels made by Simon Gryncœus; it was probably published independently, but is to be found in the Paris edition of that work.

Mercator appears to have copied his projection, with some slight modifications, from Fine, but the map as a whole differs from that of Fine in many important respects, for while he follows the 1532 map in the position of his prime meridian (about 23° 31' W. of Greenwich) and the division of the globe

at the equator, he separates the continents of Asia and America, and differs considerably from it in the position, as regards longitudes and the outlines, of the north polar region. The "Legend" informs us that in the compilation of his map Mercator had used all the best material at his command, and that it was his intention to construct maps of each division of the world separately, thus following the example set by Ptolemy in a brief, but not less universal way. This is not a literal translation, but sufficiently so to indicate the task that Mercator had set himself at the age of twenty-six. How well he carried out this intention is known to all geographers. A most interesting paper, entitled "Gerard Mercator, his Life and Works," was read by Mr. Elial. F. Hall before the American Geographical Society, April 16th, 1878, from which much of the foregoing information is derived.

EUROPE.

Europäischen Nordmeere.—Darstellungen des Specifischen Gewichtes im ——. Von H. Mohn. Tafel 1.—Die Strömungen des Europäischen Nordmeeres. H. Mohn. Tafel 2.—Die Strömungen in der Oberfläche. Tafel 3.—Die Strömungen des Europäischen Nordmeeres. Tafel 4. Petermann's 'Geographische Mittheilungen,' Ergänzungsheft No. 79. Justus Perthes, Gotha, 1885. (*Dulau.*)

France.—Carte de —, dressée par le Service Vicinal par ordre de M. le Ministre de l'Intérieur. Scale 1:100,000 or 1·3 geographical mile to an inch. Paris, 1885. Sheets:—X. 25. Rochefort. X. 26. Royan. XVI. 19. Salbris. XVII. 18. Gien. XVII. 19. Aubigny. XX. 17. Tonnerre. XXII. 20. Beaune (Est). XXIII. 20. Dôle. XXIII. 27. Voiron. XXV. 16. Epinal. XXV. 17. Luxeuil. XXVI. 19. Audincourt. Price 7d. each. (*Dulau.*)

Island.—Das Lava Gebiet von Ódðahraun in —. Aufgenommen von Th. Thoroddsen im Sommer 1884. Scale 1:800,000 or 10·9 geographical miles to an inch. Petermann's 'Geographische Mittheilungen,' Jahrgang 1885, Tafel 14. Justus Perthes, Gotha. (*Dulau.*)

ORDNANCE SURVEY MAPS.

Publications issued from 1st to 31st May, 1885.

1-inch—General Maps:—

IRELAND: Sheet 124 (with Hills). Price 1s.

6-inch—County Maps:—

ENGLAND AND WALES: Sheets: **Buckinghamshire:** (4 and 1), 5; 2s. 6d. each. **Glamorganshire:** 11, 19, 2s. 6d. each. 49, (51 and 52); 2s. 6d. each. **Oxfordshire:** 25, 2s. 6d. (13 and 7), 24; 2s. each. Quarter sheets: **Bedfordshire:** 35 N.W. **Brecknockshire:** 38 S.E.; 39 N.W., 39 S.W. **Gloucestershire:** 58 N.E. **Leicestershire:** 39 N.W., 39 N.E. with 12 N.E. (Rutland), 39 S.E. with 12 S.E. (Rutland). **Montgomeryshire:** 29 N.W.; 42 N.E., 42 S.E. **Norfolk:** 22 N.W., 22 S.W.; 57 N.E.; 65 N.W. **Northamptonshire:** 17 N.W.; 18 N.E., 18 S.W.; 24 S.E.; 25 N.W., 25 N.E.; 26 S.E.; 31 N.W.; 32 N.E.; 44 N.E., 44 S.E. **Nottinghamshire:** 9 N.W.; 42 S.W. **Rutland:** 9 S.W.; 13 N.W. **Shropshire:** 34 N.W.; 39 N.W. with 24 N.W. (Montgomeryshire). **Somersetshire:** 40 N.W.; 42 S.W.; 54 N.E., 54 S.W., 54 S.E. **Staffordshire:** 39 N.E.; 44 N.W.; 49 S.E. with parts of 37 S.E., 38 S.W., 44 N.E., 45 N.W. (Shropshire). **Suffolk:** 25 S.W., 25 S.E.; 35 S.E.; 37 N.E. **Warwickshire:** 6 N.W. with 34 N.W. (Leicestershire); 59 S.E.; (59 N.W., 59 N.E.).

Parish Maps:—

ENGLAND: **Gloucester:** Adestrop, 2 sheets; Admington, 2; Ashton under Hill, 3; Aston Somerville, 2; Avening, 4; Bagendon, 2; Bateford, 4; Beckford, 1; Bisley, 3; Bledington, 2; Bourton on the Hill, 5; Bourton on the Water, 1; Bredon, 1; Bredon's Norton, 1; Broadwell, 4; Child's Wick-

ham, 3; Church Iccomb, 3; Cirencester, 1; Clifford Chambers, 3; Clopton, 2; Coates, 2; Coates (Det., Nos. 1, 2, 3, and 4); Condicote, 1; Cow Honeybourne, 2; Daglingworth, 4; Donnington, 4; Duntisbourne Abbots, 1; Duntisbourne Rouse, 4; Edgeworth, 1; Edgeworth (Det.), 1; Harescombe, 1; Hidecote Bartrim, 1; Hinton on the Green, 4; Horsley, 2; Iccomb, 1; Kingscote, 1; Longborough, 4; Long Marston, 2; Lower Lemington, 2; Lower Slaughter, 1; Lower Swell, 2; Mangersbury, 2; Mickleton, 1; Minchinhampton, 4; Moreton on the Marsh, 3; North Cerney, 1; Oddington, 3; Painswick, 1; Pebworth, 1; Pitchcombe, 1; Prestbury, 1; Preston upon Stour, 3; Quinton, 5; Rodborough, 1; Rodmarton, 1; Saintbury, 2; Sapperton, 4; Sezincote, 3; Southam and Brockhampton, 2; Standish, 1; Strensham, 1; Stroud, 2; Tewkesbury, 1; Todenham, 1; Twynning, 2; Upper Swell, 2; Westcote, 1; Whiteshill with Randwick, 1; Willersey, 2; Winchcomb, 1; Woodchester, 1; Wyck Rissington, 1. **Leicester**: Ashby Folville, 2; Barkby, 2; Barrow upon Soar, 1; Barsby, 3; Beoley, 1; Bescaby, 2; Branston, 1; Buckminster, 3; Burrows on the Hill, 4; Burton Lazars, 6; Burton on the Wolds, 1; Cold Overton, 1; Coston, 5; Cossington, 2; Cropston, 1; Croxton Kerrial, 1; Dishley with Thorpe Acre, Garendon, and Knight Thorpe, 2; Eastwell, 1; Eaton, 1; Edmondthorpe, 2; Freeby, 6; Gadesby, 3; Garthorpe, 5; Goadby Marwood, 1; Great Dalby, 7; Hathern, 2; Hemington, 1; Holwell, 2; Hungerton, 1; Kegworth, 1; Kirkby Bellars, 3; Knossington, 1; Little Dalby, 5; Lockington, 1; Loughborough, 1; Melton Mowbray, 4; Newtown Linford, 1; Owston and Newbold, 3; Pickwell with Leesthorpe, 3; Queniborough, 4; Ratcliffe on the Wreak, 1; Rearsby, 2; Rothley, 1; Saltby, 2; Saxby, 3; Scalford, 3; Sewstern, 2; Sheepshed, 1; Somerby, 4; South Croxton, 2; Sproxton, 3; Stapleford, 4; Stonesby, 3; Swithland, 1; Sysonby, 1; Syston, 3; Thorpe Arnold, 3; Thorpe Satchville, 2; Thurcaston, 1; Twyford, 1; Walton on the Wolds, 1; Waltham on the Wolds, 5; Wanlip, 1; Welby, 1; Wymondham, 5; Wyfordby with Brentingby, 4. **Northampton**: Abthorpe, 1; Ashton, 1; Aynho, 4; Badby and Do. (Det., Nos. 1 and 2), 4; Banbury, 1; Blisworth, 1; Bozeat, 2; Bradfield on the Green, 2; Braunston, 1; Brington, 1; Brockhall, 3; Bugbrooke, 1; Castle Ashby, 1; Catesby, 3; Chacombe, 4; Cold Higham, 1; Collingtree, 2; Cosgrove, 1; Courteenhall, 4; Croughton, 1; Daventry, 4; Denton, 4; Dodford, 4; Easton Mandit, 2; Easton Neston, 1; Everdon, 4; Farthinghoe, 1; Fawley, 2; Floore, 4; Furtho, 1; Great Houghton, 2; Greatworth, 1; Hackleton, 6; Hardingstone, 1; Hellidon, 3; Horton, 4; Kings Sutton with Newbottle, 1; Litchborough, 1; Little Houghton, 2; Marston St. Lawrence, 1; Middleton Cheney, 4; Milton, 3; Nether Hayford, 2; Newnham, 6; Norton, 5; Pattishall, 1; Piddington, 6; Preston Deanery, 6; Potterspury, 1; Quinton, 3; Roade, 3; Rothersthorpe, 1; Staverton, 4; Stoke Bruerne, 1; Stow Nine Churches, 2; Thenford, 3; Thorpe Mandeville, 1; Tiffield, 1; Wappenham, 1; Warkworth, 1; Weedon Beck, 4; Whilton, 2; Whittlebury, 1; Wootton, 3; Yardley Gobion, 1; Yardley Hastings, 4. **Nottingham**: Arnold, 1; Attenborough, 3; Averham, 2; Barton in Fabis, 2; Bilsthorpe, 2; Bleasby, 6; Blidworth, 5; Calverton, 7; Caunton, 3; Clifton with Clapton, 2; Eakring, 4; East Stoke, 1; Edingley, 2; Edwalton, 1; Elston, 1; Epperstone, 7; Farnsfield, 3; Fiskerton cum Morton, 4; Flintham, 1; Gonalston, 2; Halam, 5; Halloughton, 5; Haywood Oaks, 3; Hockerton, 8; Hoveringham, 1; Helham, 1; Kersall, 3; Kirklington, 4; Kneassall, 2; Lambley, 1; Lenton, 1; Lowdham, Caythorpe, and Gunthorpe, 1; Maplebeck, 4; Newstead, 1; Norwell, 1; Oxtun, 7; Park Leys, 3; Rolleston, 4; Ruddington, 1; South Muskham, 1; Southwell, 11; Stapleford, 1; Staythorpe, 1; Thrumpton, 1; Thurgarton, 6; Toton, 3; Upton, 5; West Bridgford, 2; Wilford, 2; Winkburn, 7; Woodborough, 3. **Shropshire**: Ashford Carbonell, 1; Bedstone, 1; Bettws-y-crwyn, 2; Bitterley, 6; Bucknell, 1; Caynam, 3; Cleobury Mortimer, 1; Clun, 2; East Hamlet, 1; Farlow, 1; Greet, 1; Hopton Castle, 1; Hopton Wafers, 1; Llanvair Waterdine, 1; Ludford, 2; Silvington, 1; Stanton Lacy, 1; Stoke St. Milborough, 2; Stow, 1; Whitton, 1. **Somerset**: Backwell, 2; Barrow Gurney, 3; Bathamp-

ton, 1; Batheaston, 1; Bathford, 3; Bedminster, 3; Blagdon, 2; Burnett, 4; Burrington, 1; Butcombe, 3; Chelwood, 4; Chew Magna, 6; Chew Stoke, 3; Churchill, 1; Clutton, 1; Combe Hay, 1; Compton Dando, 7; Congresbury, 1; Corston, 2; Dundry, 6; Dunkerton, 2; English Combe, 3; Farmborough, 1; Keynsham, 4; Long Ashton, 2; Marksbury, 4; Nempnett Thrubwell, 3; Nailsea, 1; Newton St. Loe, 1; Norton Hankfield, 3; Norton Mabreward, 4; Priston 3; Publow, 6; Queen Charlton, 3; Saltford, 2; Stanton Drew, 6; Stanton Prior, 3; Stowey 3; Whitchurch, 4; Winford, 7; Wraxall, 1; Wrington, 4. **Suffolk**: Alpheton, 4; Ashfield, 1; Aspall, 2; Barking, 4; Battisford, 4; Beccles, 1; Bildeston, 1; Boxted, 1; Bradfield Cornbust, 4; Bradfield St. Clare, 4; Bradfield St. George, 5; Bradwell, 1; Brent Eleigh, 2; Brettenham, 7; Brockley, 6; Burgh Castle, 1; Buxhall, 5; Cavendish, 1; Chedburgh, 1; Chevington, 4; Cockfield, 9; Coddensham, 2; Combes, 3; Crowfield, 4; Debenham, 6; Drinkstone, 4; Earl Stonham, 4; Ellough, 1; Elmswell, 1; Felsham, 4; Framsdon, 2; Gedding, 1; Glemsford, 2; Gosbeck, 1; Great Bricett, 1; Great Finborough, 2; Great Welnetham, 7; Greeting St. Mary, 6; Hardwick, 2; Hartest, 3; Hawkedon, 1; Hawstead, 7; Helmingham, 1; Hessel, 2; Hitcham, 8; Horningsheath, 4; Ickworth, 3; Kenton, 1; Kettlebaston, 3; Lavingham, 4; Lawshall, 8; Little Saxham, 1; Little Stonham, 3; Little Welnetham, 2; Long Melford, 3; Mickfield, 3; Monks Eleigh, 1; Nowton, 5; Pettaugh, 4; Preston, 6; Rattlesden, 7; Rede, 3; Ringshall, 5; Rougham, 4; Rushbrooke, 5; St. Mary, 1; Santon Downham; Shimpling, 5; Somerton, 1; Stanningfield, 6; Stanstead, 2; Stonham Aspall, 4; Stowupland, 1; Thetford St. Mary, 2; Thorpe Morieux, 9; Wattisham, 2; Westley, 1; Weston, 1; Wetheringsett cum Brockford, 1; Wetherden, 1; Whelpstead, 6; Winstone, 5; Woolpit, 2; Worlingham, 1. **Worcester**: Alderminster, 2; Aldington, 1; Astley, 1; Badsey, 1; Bentley Paunceloot, 1; Bewdley, 1; Blockley, 5; Bockleton, 4; Bredon, 1; Bredons Morton, 3; Bretforton, 1; Broadway, 2; Cakmore, 4; Charlton, 1; Church Honeybourne, 2; Claines, 3; Clifton upon Teme, 3; Conderton, 2; Cropthorne, 1; Crowle, 1; Crutch, 2; Dodderhill, 1; Eastham, 4; Eckington, 2; Elmley Castle, 2; Feckenham, 8; Grafton Flyford, 1; Great Comberton, 1; Great and Little Hampton, 1; Grimley, 4; Hadzor, 2; Halesowen, 1; Hallow, 1; Hampton Lovett, 2; Hanbury, 4; Hanley Child, 6; Hanley William, 2; Hartlebury, 1; Hasbury, 1; Hawn, 2; Hill, 3; Hill Croome, 1; Himbleton, 5; Hindlip, 2; Holt, 4; Huddington, 3; Hunnington, 1; Illey, 1; Inkberrow, 5; Kidderminster Foreign, 2; Knighton on Teme, 1; Kyre Magna, 6; Kyre Parva, 2; Lapal, 3; Lindridge, 1; Lower Sapey, 2; Mable, 1; Martin Mussingtree, 3; Martley, 1; Netherton, 1; North and Middle Littleton, 1; Northfield, 2; Oddingley, 3; Offenham, 1; Ombersley, 6; Oldbury, 5; Overbury, 3; Ridgacre, 2; Ripple, 1; Rochford, 4; Rock, 4; St. Andrew, 2; St. Nicholas, 2; St. Peter, 1; Salwarpe, 4; Shelsey Beauchamp, 1; Shelsey Walsh, 1; Shrawley, 1; South Littleton, 2; Stock and Bradley, 3; Strensham, 1; Tenbury, 12; Tibberton, 1; Upper Arley, 2; Wolverley, 1; Warley, 5; Warndon, 1; Webheath, 1; Westwood Park, 2; Wichenford, 1.

Town Plans: Scale 1 : 500 :—

ENGLAND: Cheltenham, 3 sheets; Great Yarmouth, 7; Melton Mowbray, 4; Newmarket, 8; Tewkesbury, 7; Walsall, 5.

ASIA.

Asien, Karte von —, in Ph. Fischers perspektivischer Projection. Konstruiert von Dr. A. M. Nell. Scale 1 : 64,000,000 or 877 geographical miles to an inch. Petermann's 'Geographische Mittheilungen,' Jahrgang 1885, Tafel 15. Justus Perthes, Gotha. (*Dulau*.)

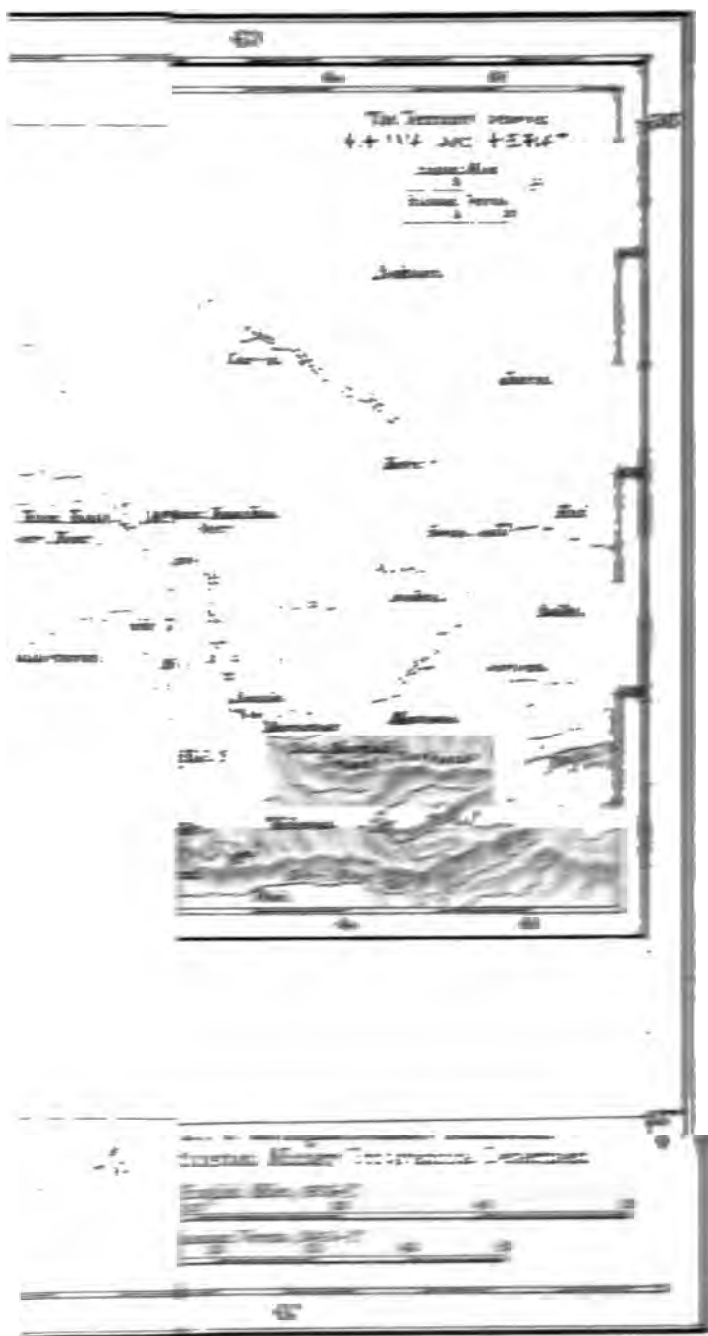
Indian Government Surveys:—

Bengal Presidency:—North-West Provinces Survey, 1 inch to a mile. Sheet No. 8. Districts Meerut and Buiandshahr, Season 1881-82. No. 9. District

Bulandshahr, Season 1881-82. No. 19. Districts Meerut and Bulandshahr, Season 1881-82. No. 33 (Western Portion). District Bulandshahr, Season 1881-82. No. 70. District Budaun, Season 1877-78. No. 126. District Banda, Seasons 1874-79. No. 166. District Jaunpur, Seasons 1877-81. No. 179. District Jaunpur, Seasons 1879-81. No. 180. District Jaunpur, Seasons 1878-80.—North-West Provinces Survey, 2 inches to a mile. Sheets No. 7 N.W., N.E., S.W., S.E. District Meerut, Seasons 1879-80-81. No. 9 N.E., S.E. Districts Bulandshahr and Delhi, Season 1881-82. No. 32 N.W., S.W., S.E. Districts Meerut and Bulandshahr, Season 1881-82. No. 33 N.W., N.E., S.W., S.E. District Bulandshahr, Season 1881-82.—Oudh Revenue Survey, 1 mile to an inch. Sheet No. 106. District Unao, Seasons 1860-64. No. 165. Districts Sultanpur and Partabgarh, Seasons 1859-64.—Punjab Survey, 1 inch to a mile. Sheet No. 18. District Dera Ismail Khan, Seasons 1874-80. No. 23. District Dera Ismail Khan, Season 1879-80. No. 26. District Dera Ismail Khan, Seasons 1873-75 and 79-80. No. 27. District Dera Ismail Khan, Seasons 1879-81. No. 31. District Dera Ismail Khan, Season 1880-81.—British Burma Survey, 2 inches to a mile. Sheets No. 114 (N.E.), (S.E.). District Hanthawaddy, Season 1881-82. No. 116 (N.W.), (N.E.), (S.W.), (S.E.). District Pegu, Seasons 1880-81-82. No. 123 (N.E.), (S.E.). District Hanthawaddy, Season 1881-82. No. 124 (N.W.), (N.E.), (S.W.), (S.E.). Districts Pegu and Hanthawaddy, Season 1882-83. No. 125 (N.W.), (N.E.), (S.W.). District Pegu, Season 1880-81.

CHARTS.

Dépôt de la Guerre, Paris.—No. 4031. Mer Méditerranée, Ile de Minorque, Port Mahon. 1884.—4059. Mer Méditerranée, Côte Est d'Espagne, Mouillages d'Estacio et de l'Île Grosa. 1885.—4040. Mer Méditerranée, Côte Est d'Espagne, Port des Alfaques. 1884.—4060. Mer Méditerranée, Côte S.E. d'Espagne, Rade de Torrevieja. 1885.—4058. Mer Méditerranée, Côte Est d'Espagne. Port de Tarragone. 1885.—4036. Mer Méditerranée, Côte S.E. d'Espagne, Baie de Santa Pola et Ile de Tabarca. 1884.—4052. Publication provisoire. Mer de Chine—Tonkin. Canaux Intérieurs entre Ak-Hoi et Tsieng-Mui-Tao. 1885.—4023. Golfe du Tonkin. Grand Baie de Fai-Tsi-Long. Chenaux Intérieurs entre l'Île de l'Aigle et la Baie d'Ha-Long. 1884. Publication provisoire.—4022. Golf du Tonkin. Archipel des Fai-Tsi-Long. Chenaux Intérieurs entre Ha-Long et Ke-Bao. 1884. Publication provisoire.—4034. Mer de Chine, Hainan, Mouillage de Hiong-Po. 1884.—4055. Côte Nord de Chine, Lu Chun Ko ou Port Arthur. 1885.—4050. Mer de Chine. Golfe du Tonkin. Côte N.O. de Haïnan. Du Cap Pingmar au Cap Lamkô (Baie de Hao-Sou), 1885.—4057. Mer de Chine, Détroit d'Haïnan (Partie Occidentale) et Côte N.O. de l'Île d'Haïnan. 1885.—4056. Terre-Neuve. Baie aux Lièvres. Bras du Sud et Baie de l'Ariège. 1885.—4048. Côte Nord-Est de Terre-Neuve. Partie comprise entre le Havre du Cap Rouge et Boutiton. 1884.—4017. Détroit de Magellan. Baie Snug. Baie Butler. Baie du Volage. 1884.—4208. Terre de Feu. Canal du Beagle. Croquis du Mouillage de Lapataia. 1884.—4042. Archipel du Cape Horn, Canal du Beagle. Passes de l'Île Gable, Mouillages de Packewala et des Chasseurs. 1884.—4021. Terre de Feu, Canal du Beagle. Port et Passes d'Oushouala. 1884.—4041. Océan Atlantique, Ile de la Grande Canarie, Baie de Las Palmas et Port de la Luz. 1884.—4063. Océan Pacifique, Archipel de Cook. Vues dessinées en 1883. 1885.—4000. Océan Pacifique Sud. Nouvelles Hébrides. Malicolo, Côte Est. Croquis de Port Stanley. 1884.—4062. Océan Pacifique. Archipel Tubuai. Vues dessinées en 1883. 1885.—4053. Océan Pacifique Sud. Ile Futuna. Croquis de l'Anse de Sigave. 1885.—Dépôt des Cartes et Plans de la Marine, Paris.





PROCEEDINGS
OF THE
ROYAL GEOGRAPHICAL SOCIETY
AND MONTHLY RECORD OF GEOGRAPHY.

A Journey through the Somali Country to the Webbe Shebeyli.

By F. L. JAMES, Esq.

(Read at the Evening Meeting, June 29th, 1885.)

Map, p. 704.

It had long been my wish to explore the interior of the Somali country: therefore, in January 1884, accompanied by my brother and Mr. E. Lort Phillips, I embarked in an Arab dhow at Aden, and visited Berbera and Zeila, the two chief Somali ports. At Berbera we made a short expedition to the foot of the great hill range, trusting ourselves entirely to a Somali escort. The people appeared to be so friendly, and encouraged us so much to go further inland, that we went back to England fully determined to return and strike for the hitherto unexplored Ogadayn country. With the exception of Herr Haggenmacher no European had penetrated southwards beyond the high range of hills visible from the coast. Herr Haggenmacher had gone about 50 miles beyond these hills, but his map is not a very trustworthy one, as from fear of the natives he had been unable to use his instruments. On the coast the principal explorers have been Cruttenden, Speke, Revoil, Hildebrand, and Menzies. None succeeded in getting beyond the maritime plain. The Italian Sacconi, who endeavoured to penetrate Ogadayn from Harrar, paid with his life for the attempt. Captain Burton was the first explorer, but his explorations were far to the west of our intended route. We found his book, 'First Footsteps in Eastern Africa,' however, a useful guide, and a capital account of one of the most successful and plucky journeys ever accomplished in Africa.

We reached Aden in November of last year, with a further addition to our party in Mr. Percy Aylmer and Mr. Godfrey Thrupp, and two European servants, Durling and Anselmier. Here we succeeded in getting together a band of Somalis to act as an armed guard, and were particularly fortunate in securing the services of one named Dualla

Idrees, who spoke English well, and who for several years had been one of Mr. Stanley's chief men on the Congo. We made him our headman and found him of the greatest use, and his tact and management of the natives contributed very largely to our success. After a very pleasant visit at the hospitable house of General Blair, the late Resident at Aden, on the 8th of December we embarked in a dhow for Berbera with our Somali servants, and some horses and mules which we had purchased at Aden.

On arrival we despatched two of our headmen into the interior to collect camels for our luggage, which had increased to considerable proportions, as we had to carry quantities of cotton cloth and beads—money in the interior being unknown—in addition to rice and dates for our servants. Our previous experience taught us it was better to hire than to buy these camels, for the natives are always careful about their own beasts, and thus the risks dependent upon injury or theft would be greatly diminished. From all accounts we heard previous to our start, we were led to believe that our camels would be stolen within the first few days, unless a most careful guard were kept over them, and the best guards were clearly the men who were the owners of the beasts.

After something more than the usual delays and vexations consequent upon all dealings with natives, a contract was signed by which we hired sixty camels and thirty drivers who were to accompany us as far as the Webbe Shebeyli. We left Berbera on December 23rd; our road lay nearly south, and led between steep hills and along riverbeds till we reached the foot of the mountain range, 40 miles from the sea, and 2200 feet above its level. The whole of this country is called by the Somals "Guban," while the cooler country beyond the hills is called "Ugub." During the winter months the natives descend from the plateau, and at this time Guban is dotted with villages and covered with flocks of sheep. Numerous small streams flow from the mountains, and grass grows in the crevices of the rocks affording sufficient food for the sheep.

Every Somal carries two spears, a shield, and a short sword, and the slightest difference of opinion with his neighbour causes him to instantly draw his sword or to thrust with his spear.* Fortunately the tribal laws are severe against any one who takes a life, the fine being a large number of camels, which have to be paid by the tribe if the individual is not sufficiently wealthy to pay them himself. For this reason it is to the advantage of the kinsmen of the combatants to separate them before much harm is done. They can nearly always show you several wounds, and are just as proud of those which are behind as they

* The Somal approach more nearly to the ancient Egyptians in many ways than any other African race with which I am acquainted. Their swords, for example, are exactly like those used by the ancient Egyptians.

are of those which are in front. Their condition of health is such that they survive even the gravest wounds, and we saw many cases in which men recovered quickly from injuries which would have certainly been fatal to Europeans. They have quick tempers, which, when aroused, are absolutely beyond control, but if once you can get a Somal to listen to your arguments, you can nearly always turn him round to your way of thinking. They are very great talkers, and every new plan is discussed for hours. They will sit in a circle, and divide themselves into two parties, each appointing a spokesman, who, squatting a little in advance of his fellows, and holding a stick in his hand, will draw intricate geometrical designs on the sand, and at the same time hold forth lengthily on the subject in discussion. However slowly he may talk, and however long he pauses to collect his ideas, he is rarely interrupted until he has quite finished. They are keenly sensitive to ridicule, and if there be a mutiny amongst your men—as happened to us more than once—and you can manage to make the people laugh at their ringleader, he will be completely cowed, and covering his face with his *tobe*, will retire.

On the third day from Berbera we had our first serious trouble with our men, and this was caused by a curious trait in the Somali character which makes them rebel against anything in the way of a leader. We had endeavoured to divide them into three parties, for purposes of defence and guard at night, and over each of these parties we had placed a headman. The others at once threw down their rifles and refused to proceed: the camel men then interfered, and a free fight was the consequence, which with great difficulty we succeeded in stopping before much damage was done. I may mention that it was only during the first part of our journey that we had serious trouble with our people; afterwards in Ogadayn a common danger made them more careful in their behaviour, and a threat of expelling from camp any who gave trouble effectually kept them in order. We also got to understand and to like each other, and we never had the slightest reason to suspect or to fear treachery.

Every night whilst in the more populous districts a number of natives would come to be fed. This was a most serious tax on our resources, but one which we were seldom able to refuse. They would sit silent on the ground near the camp fires where our men would be eating, and though they never asked for food, they always succeeded in getting it given to them. At the foot of the mountains we were met by Sultan Aoud, the Sultan of one part of the great Habr-Gerhajis tribe. We turned out our escort, whom we had endeavoured to drill and teach the use of firearms, and forming them in line, saluted with a volley. The Habr-Gerhajis tribe had formerly been under one sultan, and were very powerful, making frequent raids into Ogadayn; but on his death two cousins, Aoud and Noor, divided the country between them, and since

then they have been constantly at war with each other. Sultan Aoud was a fine-looking man, but I suppose from fear of his neighbours had never visited the coast, and spoke no Arabic.

With considerable difficulty and the aid of the Abdul-Ismael tribe of Somals we got our laden camels up a difficult pass which led to the top of the mountains, 4700 feet above the sea. The scenery amongst the mountains presented a pleasant contrast after the Guban. The hill-sides were covered with thick jungle, and gigantic euphorbia, somewhat like the quolquol which grows on the Abyssinian mountains. On the top we found the only building we saw in the country—a sheikh's tomb—and also large stone mounds, which the Somals ascribed to the Gallas.

The first day's journey after we reached the top of the mountains took us well away from the hills, and we entered on the level stoneless plain, which stretches without interruption for 200 miles south. At first our route lay along the course of the Tug Dayr (the long river) till we reached a well called Burao, whence we were to strike across the long waterless stretch of the Haud to Ogadayn.

The Tug Dayr is a large watercourse, dry except during the rains, but with numerous deep wells, in the vicinity of which the Somals live. Captain Burton, in his 'First Footsteps in East Africa,' mentions the probability of the Tug Dayr and the Wady Nogal being one and the same thing. This by careful inquiry from the natives we believe to be the case. Nogal is the name of a large district to the east of the Haud, and not of a river; no river-bed is called wady in this country, but Tug. After leaving the Habr-Gerhais country it flows in a westerly direction through the Habr Tdialeh tribe and on through the Dolbohanti country, through Nogal, and ultimately flows into the sea north of Garad.

On our arrival at Burao, Sultan Aoud collected his people in our honour, and they went through some well-executed evolutions on horse-back before our zariba; charging in a body—there were about 200 of them—and with wild shouts flinging their spears into the air, and then all reining up their horses on their haunches close to our inclosure, shouted "Mort, mort" ("Welcome, welcome"), to which we replied "Kul leban" ("Thanks"). Another day the Midgans, a low-caste tribe who carry bows and poisoned arrows, came with numbers of tame ostriches, whose feathers they pluck and send to Berbera. Their bows were decorated with white ostrich feathers, and they went through a curious dance.

These Midgans are found living among all the Somali tribes, and are very much looked down upon. There are two other low castes: the Tomals, workers in iron, and the Ebir, workers in leather charms.

Here we were to start on our long waterless journey. Sultan Aoud promised us every assistance, camels to carry water, and men connected with the Baha Wadly, the first Ogadayn tribe we should meet, to go with

us. Suddenly we noticed a great change in their behaviour ; they divided up into parties under the trees, and entering into long discussions, gave up all preparations for our departure. We were not long in finding out the reason of this change. A Somal had arrived with a letter from Major Hunter—the British Consul-General for the Somali coast—enclosing copies of telegrams from Earl Granville ordering Major Hunter to stop our departure from the coast. The messenger had been instructed to try and stop our continuing our journey, and, in order to do this, he went among the natives, telling them not to assist the Christians who had come to take the country, demanding why they permitted Christians to drink at their wells, where no white man had ever drunk before. Luckily for us, the messenger was of a different tribe from that we were among, and well known as a very troublesome man and a great mischief-maker. By doing too much he defeated Major Hunter's object, and we despatched him back to the coast with a letter to Major Hunter, in which we showed that although the Government had ordered him to prevent our departure, they had said nothing about forcing us to return if we had already gone, and pointing out the danger we had been placed in through the conduct of the messenger. We then, after great delays and endless discussions, succeeded in making a start. Just as we left Burao another letter was handed to us from a friend at the coast, warning us against the extreme danger of proceeding, as Lord Granville's telegrams *were public property* in the bazaars at Berbera, and the Ayal Achmet—the tribe inhabiting Berbera—would not unnaturally think that hindering us would find favour in the sight of the British Government. We knew the Ayal Achmet were strongly against our journey, and a messenger from Berbera told us they had sent letters ahead of us to Ogadayn trying to rouse the people against us. This we subsequently found to be true, and our chief difficulty in Ogadayn was counteracting the influence of these letters, which several times put us in great danger.

At Burao we procured extra camels to carry water, as we were told we had a waterless stretch, variously estimated at from seven to nine days to cross, at the end of which time we might find a little water by digging, but if not, three days farther would bring us to a well. In consequence of the excitement caused amongst the natives by the messenger who brought the telegrams, we further completed our preparations by taking with us three men, relations of Sultan Aoud's, who had daughters or sisters married among the Baha Wadly, the first tribe of Ogadayns we should see, and who would therefore, in the language of the country, act as *abbans* or protectors. We bought a flock of forty-five sheep and a number of camels for food on the way for our large following, which now amounted to nearly 100 people, as we had extra drivers with the new camels, one to each beast.

On the 9th day of January we started across the Haud on a most monotonous and trying journey. The animals had nothing to eat but

the driest of dry grass, and the whole way there was not a single shade tree or any signs of a watercourse to vary the monotony of the dead level country. Belts of dried mimosa alternated with open plains of shrivelled grass, and as we got further south the skeletons of gum-bearing trees completed a forest of desolation.

On the second day our camel-drivers, who I imagine had all along thought we never would attempt to cross the desert, mutinied and declared they would go no farther; we told them that if they returned we would drive the camels on, and that not one animal should be taken back alive. After an animated argument they agreed to load up, and sullenly did so. The water-camel men then insisted on returning, as they were frightened of being attacked on the way home by the rival sultan (Sultan Nur); however, we made them accompany us one day farther (five days in all), and then loading up our own camels with the water, allowed the others to return.

On the eighth day we were told we were approaching the place where water might be found by digging, but our men feared Dolbohanti marauders, who they said watched for caravans, and so we pitched our camp and sent out scouts. Night came on and they had not returned, and we were all getting anxious about them, when two arrived and said they had found a little water by digging. Early on the ninth day we marched on and reached Hodayu, which, as it is characteristic of all the natural watering places we saw, I will here briefly describe. As I have said, the country is level and stoneless, but at certain places the rock—red sandstone—appears on the surface, and large barren depressions are formed, varying from 10 to 100 acres in extent. In this the water collects during the rains, and remains for perhaps two months after these rains cease. Hodayu was one of these natural pans; it was quite dry, but by digging in the fetid black earth to a depth of six or eight feet, a small quantity of liquid black mud was obtained. Our men dug thirty or forty of such holes, and we stayed one day collecting the water, after which we marched on and reached the first Ogadayn wells on the fourteenth day, fifteen days after our camels had had their last drink. I may here mention that all Somali animals appear to be able to stand thirst in a most remarkable degree. A sheep will go six to eight days, and our horses several times went three days without water and without apparent suffering. Our arrival at the wells of Gerloguby astounded the Somals who were watering great herds of camels and flocks of sheep. Their attitude was menacing, and we therefore quickly formed a strong zariba. Round this they crowded in hundreds and expressed the greatest amazement at us and our doings. Smoking particularly astonished them, as they thought a pipe was part of our persons, and that the white man kept a fire somewhere inside, and when one of our party shot a bird, many fell down, while others invoked the protection of Allah. We despatched as soon as possible messengers for some headmen well known to our people, and in

the meantime tried to make friends with those who were about us, but they met our advances coldly and seemed very uncertain how to treat us; indeed, afterwards, when we really became friends, they did not hesitate to say that they had determined to kill us as soon as possible. Some headmen at last arrived and began to make known their wants; as these started with the modest demand of 4000 pieces of cloth, negotiations proceeded but slowly; suddenly a cloud of dust was seen, and our men shouted that we were going to be attacked. Upon this we sounded a call to arms and closed the gate of the zariba. A large crowd of horsemen, spearmen and bowmen surrounded us, and the noise was so great that it was some time before we found out they had come to inquire what we wanted in their country and to back up their demand for 4000 pieces of cloth. They performed evolutions round the zariba, similar to those we had seen at Burao, and this was followed by long and loud addresses, in which they described their valour, and showed how they could vanquish all other tribes. This over, we in our turn said we would now show them what we could do, and thereupon we formed our men in line and fired volleys into the air. This action on our part probably saved us from immediate attack. In addition to some twenty-five stand of Remingtons, we had served out for this occasion our elephant guns and all our sporting rifles; and the impression produced by the reports of the former, was evidenced by the chorus of Allahs with which those reports were greeted. Many ran away, upsetting all with whom they came into contact; others threw themselves on the ground and covered their faces, and there was a general stampede of riderless horses.

At last the efforts of our headmen were successful in securing three chiefs of the Rer Dollol tribe as abbans. As these men belonged to one of the most powerful Ogadayn tribes, we were given to understand that their presence in our camp would insure our being well received by other tribes. They were given a small present of cotton cloth, and two bales were distributed among the other headmen. This completed our negotiations, and enabled us to leave Gerloguby for the Webbe after a delay of thirteen days. Of all the watering-places for cattle, Gerloguby is the chief in Eastern Ogadayn; the wells are numerous and never fail. They are cut through the solid rock, to a depth, in some cases, of 60 feet, and date back to the Galla occupation of the country.

We had not proceeded far on our fresh journey before we found that a large section of the people we met were opposed to our advance. Letters had been sent from Berbera, telling them that we were coming, and that if they allowed us to return we should be succeeded by others more numerous, who would take the country from them; that in fact we were only acting as spies for the English, who were everywhere attacking the Mussulmen, and seizing their lands. On our road lay an important village of priests called Faf, the only permanent village we saw between the coast and the Webbe, and here it was that we were led to expect

the greatest opposition. No sooner had we encamped near Faf than our scouts brought in news that the natives were collecting in large numbers for the purpose of attack; all night we kept under arms, and fired off occasional volleys, chiefly to please our own people, who always felt more secure when firing—and partly to let any neighbours know we were awake. Next day we rode close to the village, and pitched our camp, surrounding it with a strong zariba, among the finest trees we had seen since leaving Burao, and close to the Tug Fafan a river which, during the rainy season, floods the entire country. All around we saw signs of cultivation, and wild cotton was plentiful, brought I imagine from the Webbe, where it is cultivated. Our abbans started for the village, and after negotiations which lasted for two days, and during which time the natives had viewed us with considerable suspicion and hostility, we succeeded in persuading the head priest to pay us a visit. A little civility, a cup of coffee, a few pieces of cloth, and a display of some children's picture-books brought for the purpose, made him our ally, and henceforth we had no further trouble in that particular place. Following the course of the Fafan for some distance and then striking across a low range of hills we reached the Webbe on the 18th day of February. The view of the Webbe valley as we descended the hill was very fine, and unlike anything we had seen in the country before. A green and lightly-wooded plain dotted with flocks and herds, and relieved here and there by native villages, formed the foreground to a thick belt of grand trees which marked the course of the river. Beyond this a barren expanse of land extended to a high range of mountains, whose summits were lost in the mass of clouds which hung about them. We pitched our tents among the Rer Hamers, the first Somali tribe against whom we had no reason to complain. They seemed to be the only Somals who did not fight with the Shebeyli people, and who were not afraid to live near them.

The Shebeyli sultan came to our camp, and through our abbans informed us that he and his ancestors, all Hawiya Somals, had for many generations ruled over fifty-six villages of the Adone—as the Shebeyli folk are called—and that latterly half his villages had revolted, and electing another sultan had separated from him. He invited us to accompany him to his principal village, which we accordingly did, and making a strong zariba on the edge of the river prepared to enjoy the luxury of shady trees and of plentiful water. The Webbe* we found to be a rapid and deep river, measuring 50 yards in the broadest place; and we were told that a week before our arrival it had been nearly empty and easily fordable, but that lately, owing to rains having fallen towards Harrar, it had come down in flood. It is a singular fact that this immense volume of water never reaches the sea, but after flowing to within half a degree of the equator loses itself a few miles from the coast.

* Webbe is simply the native name for river, and Shebeyli means leopard.

Crocodiles and fish were plentiful, and in some places where there were large marshes, hippopotami abounded, and waterbuck and other antelope were numerous. The natives, who were different in every way from the Somals, cultivate the land, and plant quantities of dourra as well as pumpkins, and a kind of bean. Most of them presented strongly marked negro features, and though they spoke a Somali dialect, it was not their own language, which is the same as that spoken on the coast between Merka and Zanzibar.

They live in permanent and neatly made villages built of durra stalk, and cultivate the ground extensively, digging channels from the river for purposes of irrigation. Durra similar to that grown in Egypt is the staple food, and attains to a height of 15 feet; a heavy camel load costs from two to three tobes—18 to 27 yards of cloth, value at Berbera about 7s. Like the Somal, the Adone have large herds of cattle and flocks of sheep, but all these animals are poor and suffer from the fly in the rain and from the ticks in the dry season; neither camels nor horses are used, for they will only live in the dry season, but the Rer Hamer, who leave the river valley for the plateau in the wet season, bring numbers to graze there in the winter. All small articles are exchanged for beads, but sheep and cattle are paid for in cotton cloth, the former costing one tobe and the latter five to eight. Unlike the Somals the Adone eat fowls, and by means of empty tins and bottles we were able to obtain a pleasant change in our diet. All the chief men are Hawiya Somals, but negroes form the mass of the population, and of these the majority are slaves. The Adone detest the Somal, but the latter are obliged to deal with the former for grain, though it rarely happens that their caravans return from the Webbe without being attacked. All are armed either with spears—of a different shape from the Somali spears—or with poisoned arrows, and a man is not looked upon with favour by the women of his tribe till he has killed another, either in fair fight or, what is very much more common, by assassination; this entitles him to paint the boss of his shield red or to wear a feather in his hair.

Arrived at the sultan's village, Barri, we were hospitably entertained, but we had not been there many hours before we found that we were the central figures of a political crisis, and expected to take part in what the sultan intended to be a brilliant *coup d'état*.

Within three miles of the sultan's village was that of his rival. This man, once a subject, was now a formidable foe, for he had gathered round him a following which far exceeded in numbers and in fighting strength that of our host. No sooner, therefore, did the Sultan of Barri hear of our approach, than he determined to place us in a position from which, in order to save ourselves, we should be forced to act as his ally. His first step, as I have shown, was an invitation to his village with the promise of a hospitable welcome. His second was to send a message

to his rival, saying that unless he at once tendered his submission, he would level his village and destroy his following, and that with this object he had obtained an army from Europe furnished with weapons which no mortal could resist. Until we arrived, the Sultan of Barri had been in daily fear lest his rival should be the first to indulge in acts of open hostility, in which case, by his own confession, he would have been powerless to defend himself, for many of his own people were wavering in their allegiance, and prepared at the first opportunity to go over to the stronger side. It is needless to say that this manoeuvre on the part of the sultan was unknown to us until we had established ourselves by the side of his village, and were surrounded by some 1500 of his people, and from their attitude it appeared more than probable that if we declined to give them the assistance they desired, their first act of hostility would be towards ourselves. Once possessed of our arms, they could easily frighten their neighbours into subjection, and the loot offered by our camels, horses, and camp equipment, was tempting to people who covet all they see. However, we flatly declined to fight any battles but our own, and endeavoured to make it clear to the sultan and to his people that if they wished to interfere with their neighbours, they would have to do so without receiving any assistance from us or from our men.

It was not long before news of our decision reached the rival village, who, attributing our attitude to fear, at once expressed their intention to attack the Sultan of Barri and his European army too. This increased the difficulty of our position, for, on the one hand, if we left, we should have been at once attacked by the people of the sultan, while on the other hand, if we acted as their allies, we were to be overwhelmed by their more powerful rivals. The middle course, which was to remain neutral, seemed likely to end in the probability of the two hostile villages combining their forces against us; and though this might have been a peaceful solution of the quarrel between the Adones, it was not one which commended itself to us as at all convenient. The united strength of the two villages amounted to some 4000 warriors, a number which we, with our little band of sixty, could scarcely expect to defeat. However, we adhered to our first resolution, and strengthening our zariba with such material as we could obtain, prepared to await events. Our rear had a natural protection from the river, which was some 50 yards in width, and well guarded by crocodiles; therefore from that side we had only to fear the poisoned arrows of the archers, who had good cover in the thick jungle on the opposite bank. The erection of a low traverse, however, enabled us to feel secure against this weapon, and our main efforts were directed towards our front and flanks, which were exposed to direct assault. Fortunately the country here was too open to afford much cover to any enemy by day, but a large force might have crept up to within a hundred yards of us at night.

For the first five days we were kept in a condition of tension which was as irritating as it was wearisome. The blowing of the war-shells, the yells of the women, the continuous reports that the enemy were coming, and the demonstrations of the sultan's warriors, made night and day one long and tedious watch, in which sleep or rest in any form was impossible. During these days we allowed our men to fire frequent volleys in the air, while we made short shooting excursions, and succeeded in slaughtering a number of crocodiles and many of the larger antelopes. This produced an excellent effect on the sultan's people, and gave them so much respect for our rifles that we soon felt sure we should have little to fear in the way of a surprise from them; and the sense of security from at least this danger induced us to cross the river on a rough raft and explore a few miles of the country on the opposite side, where game was abundant. At the end of the fifth day the sultan came to us with a very cunning proposal. He said the enemy were so much afraid of our rifles that though they had made frequent feints, they had never dared to approach within a mile of our zariba, and he now saw his way to reconquer his revolted subjects without bloodshed. His scheme was that we should advance with all the circumstance of war upon the enemy, while he and his people followed behind. That on reaching the village we should arrange our men as though we were about to attack, but that before we fired he should rush forward and implore us to desist from the slaughter of men who once had been his loved and faithful subjects. Thus those now in revolt would look upon him as their saviour, and at once return to their former state of allegiance. This was very ingenious, and doubtless an excellent programme as far as the sultan was concerned, but it did not suit us to leave ourselves and our camp equipment exposed to his people who were to form our rear, nor did we at all share the sultan's professed certainty as to the peaceful results. We, therefore, again declined to interfere in any way, and again expressed our determination to do nothing but defend ourselves. The following days were repetitions of the preceding ones—alarms by day and alarms by night, all accompanied by shrieks and yells, by wild war-dances, and great parades of warriors, who rushed about, and showed in pantomime how great and terrible they were, and how a thousand phantom foes were falling beneath their spears. It now seemed hopeless to expect to leave the Webbe without a fight, and we all felt a sense of relief when a crisis arrived, and the enemy came out in their full strength to attack. When, however, they were within a few hundred yards of us, the discretion of their leaders suggested a halt and a consultation. During this we sent an advance guard headed by our chief man Dualla, who challenged the enemy when he got within bowshot. The answer was a volley of imprecations, and in return our men replied by a few shots, fired high, and then they galloped back to

us. Upon this the enemy retired, and spent the remainder of that day in consultation. We also took counsel together, and decided to go straight up to the enemy's village on the following day and settle the question one way or another. We were weary of everlasting alarms and feints of attack; all efforts at conciliation had failed, and it seemed that we had either to remain indefinitely in a state of blockade on the Shebeyli, or to fight our way out against serious odds and great disadvantages. Next day, while we were preparing for our exodus amid the usual cries of alarm and warlike demonstrations of the villagers, some sixty of the enemy appeared in sight, with their spears reversed in token of submission. Among their number was the sultan's rival, who was received with yells of welcome on all sides, and carried on a platform of raised shields into the presence of his now acknowledged sovereign. Thus peace was declared between these two claimants to the royalty of the river, but we learnt from our spies during the night that it was probably only the first move towards a combined attack upon us. Therefore before daybreak we gave the order to load the camels in silence, and with the first streaks of dawn left the rival sultans in possession of our empty zariba, and by a rapid march reached the neighbourhood of our old friends, the Rer Hamer. We were much disappointed at having to return northwards, but we were quite unable to persuade any of our men to accompany us further south. Fear of the Adone worked strongly upon them, and they urged with great reason that the rains, which might be expected to commence any day, would render travelling impossible with camels, both on account of the mud and also on account of the fly. We offered them every inducement to proceed, but nothing would make them alter their minds.

Travelling along the Webbe westwards, we encamped again amongst the Rer Hamer, and set to work endeavouring to buy animals as food for our men, for our camels were still in such bad condition, owing to the effects of the long desert journey, that we were unable to load them up with corn. Here, as elsewhere in Ogadayn, we experienced the greatest difficulty in buying food; flocks and herds abounded, yet the natives were most unwilling to part with their animals at any price, and at last we determined to go farther north and to pitch our tents and wait there until our abbans, whom we sent out in various directions, were able to purchase the eating camels we required. These are bred in large quantities solely for the purpose of food, and attain to a very large size, the hump alone weighing in many instances as much as 100 lbs. They are driven in herds to the coast and sold for prices ranging from 18 to 25 dollars, and their flesh is much prized by the Somals, as they imagine that by eating camel's flesh they acquire the camel's power of being able to endure great hunger and thirst.

Reaching the Tug Fafan by a new route, we were able to cross it at once. This was fortunate, as on the following day violent storms of

rain burst over the valley, and the Tug became a roaring torrent; the rain was almost continuous for several days, and impeded our progress, as the ground became soft and slippery and thus dangerous to our animals. The whole of the valley of the Tug assumed the appearance of an immense lake, bearing out what all the natives told us, namely, that the Farfan never reached the Webbe, but lost itself in a series of marshes, the largest of which is called "Dobwayn," the Somali term for "great mud."

Continuing our journey as soon as the state of the ground permitted us to do so, we reached Hahi, where we determined to remain to collect provisions before starting over the long stretch of waterless country, which extends north to the mountain range. The rain had ceased, but its effect was evident, for the aspect of the whole country was changed; trees were covered with leaves, and the ground was carpeted with flowers and grass. The natives, who during the dry season make their villages within two or three days' journey of some well from which they draw their supply of water, had now spread themselves all over the country, and their cattle were luxuriating in the new grass. It is during this season too that the Ogadayns push farther north, and live near the various pools formed like Hodayu by a depression in the rocks, while the coast Somals press farther south. Thus antagonistic tribes are brought into close relation with each other, and as a result raids are frequent, and blood feuds kept alive. The Rer Harun and the Rer Ali, who inhabit the Tug Fafan in the dry season, move eastward to the large district called Harradiggit, which contains many pools. We had frequent discussions with our guides as to the best road back, and found we practically had the choice of three, which represented the principal trade routes between Berberah, or Bulhar, and eastern Ogadayn, the one we came by not being a trade route. The most westerly, and by far the most important, follows the Fafan as far as Milmil, and then extending for a five days' journey across a waterless stretch reaches Harrer es Sagheer. The middle one, called Wadaa Gulif, follows the Fafan as far as Warandab, and then extending towards the east, passes Harradiggit and the Toyo plain, having a stretch of seven days without water from Harradiggit to Syk. The most easterly route, called Wadaa Hamid, goes from Hahi to Farfanyer near Hodayu, and thence due north through the Toyo plain to Gunder Libah, and this is the most waterless route of the three, except during the rains. I may mention that there is still another route, Wadaa Arnot, or the "fruitful road," farther east, through the Dolbohanti country, but this is rarely used by large caravans.

We gave up the western road, as we should have had to pass through the Rer Ali and the Rer Harun, who were reputed very troublesome, and we were anxious to avoid delay; the eastern road was too near our former one to commend itself to us, and we therefore determined to

strike nearly north and to join the Wadaa Gulif road at Harradiggit. Before starting we were anxious to feel certain that the rain had extended farther north, and so we despatched two men to Harradiggit. They were away just over thirty-six hours, and performed a most remarkable feat of endurance. Starting with nothing but a skin of milk between them they marched to a waterpool called Deta, and back, a distance which we found afterwards to be 120 miles. None of our men seemed to be at all surprised at the rapidity with which the march was made. After nearly a fortnight's delay, and having succeeded in buying a few camels and sheep for food, we continued our homeward journey and fully justified the Arab proverb which says, "God help the goer, but the return is rolling." Abundant rain filled the waterpools, green grass and trees enabled our camels to pick up their strength, and as their loads were light, nearly all our stores and provisions being finished, we were able to make a rapid march. On the 10th of April we reached Sultan Nur's territory and were received by a large deputation on horseback who were anxious to prove that they were more powerful than Sultan Aoud's people who had given us a similar reception on our outward journey. With the greatest difficulty we managed to get away from them after only half a day's halt, and then continuing northwards across a wild country intersected by ravines and watercourses, we descended a magnificent pass which led to the maritime plain, and hurried on to Berbera, reaching that town on April 16th, one day ahead of our caravan. We had the satisfaction of feeling that we had neither lost a life nor been obliged to take one.

Before closing I should like to say a word as to the commerce of the country. Of the amount of that commerce I will not speak, as that may be accurately determined by reading the official reports published by the Aden authorities, but what I wish particularly to draw attention to is the fact that so small a quantity of English goods enters the country. All the cotton cloth, with but few exceptions, is of American or Indian make, and the only English cloth we took was taken on account of its rarity as presents for chiefs. Natives of India have for generations lived at Berbera and supplied the traders from the interior with goods; this no doubt accounts for the Indian cloth so largely used, but why is American cloth so common there?

I trust the English authorities now firmly established at Berbera will do all they can to assist natives arriving from the far interior in disposing of their goods at the coast. The custom is for the Ayal Achmet to act as brokers, and too often most of the profits stick to the hands of the middle man. Till lately no Ogadayn ever went to the coast, but intrusted their goods to coast traders; now, however, they are beginning to trade for themselves, and each year find their way to Berbera and Bulhar in increased numbers; this must, and indeed already has, tended to open up the country, which has been hitherto closed to

Europeans, more on account of a distrust of their motives in travelling, than from any real hatred to the white man.

With regard to the scientific results of our expedition, besides the map which was most carefully made by my brother and Mr. Aylmer, who fixed astronomically, after a series of observations, all the important points on the route, we have to point to collections of mammals, birds, plants, and butterflies, in all of which several new species were found; a detailed description of these collections will appear appended to this paper in the 'Proceedings.'

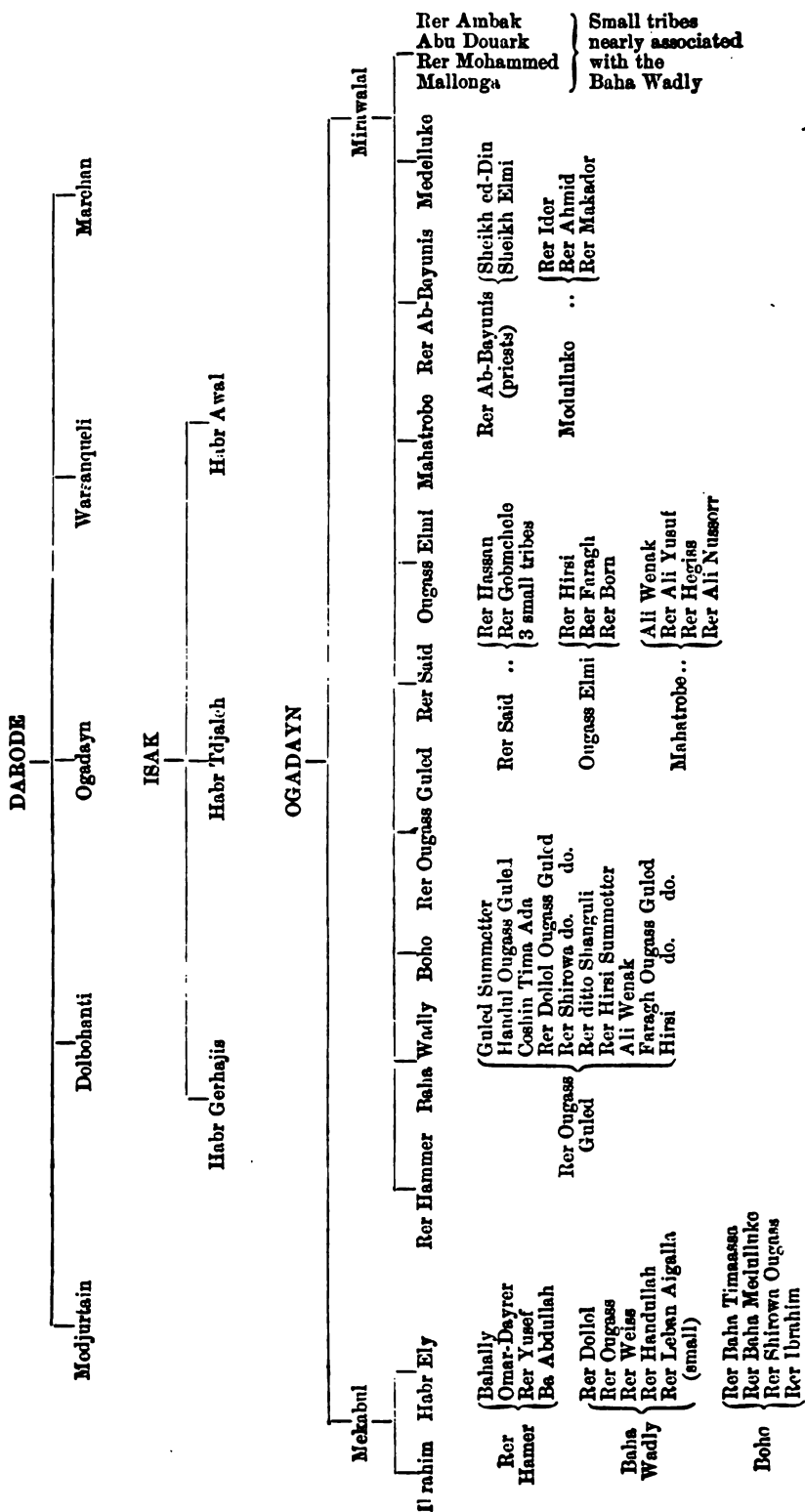
Genealogical Table of Somali Tribes.—All the tribes are either descended from Darode or Isak, two brothers. The Ogadayn are descended from Darode, and have two great divisions, Mekabul and Mirawalal; these divisions are again subdivided into innumerable subdivisions, the principal of which are given in the table on the following page.

Note by Professor Oliver, F.R.S., Kew, on the Botanical Collection made during the Expedition.—The collection made by Messrs. James and Thrupp includes nearly 150 species, chiefly of herbs and undershrubs, indicating a flora of low growth. They do not materially modify the general characteristics of the Somali-land flora as indicated by M. Franchet in his 'Sertulum Somalense,' which was based upon the collections of M. Révoil and the sparing materials sent to Europe by the late Dr. Hildebrandt. They, however, considerably enlarge our knowledge of the vegetation of the country, having been the result of travel over a more extensive area, and they further contain several new species. These latter have been described by Professor Oliver for publication at Kew, and will appear with plates in a botanical work, the 'Icones Plantarum.' Unfortunately no specimen of the myrrh and balsam yielding plants (*Balsamodendron* and *Boswellia*) are contained in the collection.

One of the most interesting discoveries is a flowerless specimen of a plant affording an arrow-poison, which Professor Oliver has identified with the *Adenium Somalense* of Dr. Balfour, a plant belonging to an order (Apocynaceæ) notorious for its poisonous juices. This is not the previously described arrow-poison of Somali-land, called *ouabaio*, and upon the medical and toxico-physiological properties of which a memoir has been written by MM. de Rochebrune and Arnaud in the 'Mission Révoil.' The material sent home by M. Révoil did not suffice for the determination of the botanical affinities of the plant affording the *ouabaio*, these consisting of only flowerless twigs. M. Franchet, however, provisionally referred it to a species of *Carissa* (or *Acokanthera*). A species of this genus has also been sent home by Dr. Hildebrandt from Somali-land with the statement that the juice of the root is used as an arrow-poison, and it appears to be identical with *Carissa Schimperii*, a native of Abyssinia; and as Heales gives the same name (*Spillea Wabajo*) for this plant, it may be concluded that there are two arrow-poisons in Somali-land, that of the *Carissa*, found by Révoil, and the *Adenium*, found by Messrs. James and Thrupp.

Zoological Collection: Mammalia.—Mr. Oldfield Thomas, of the Zoological Department, Natural History Museum, South Kensington, supplies the following note:—

The specimens consist of (1) *Heterocephalus phillipsi*, a new species of hairless rodent, allied to the remarkable *Heterocephalus glaber* Rüpp, described in 1845, of which none but the original specimen have ever been obtained. The specimen collected by Mr. Phillips was exhibited and shortly described at the Zoological Society's meeting in June, and will be the subject of a further more detailed



communication to the same Society. (2) *Crocidura* sp., a minute shrew, obtained by Mr. James, is believed by Dr. G. E. Dobson, who has paid much attention to this group, also to represent a new species.

Birds.—Captain G. E. Shelley reports that the collection of birds made by Mr. James and his party is excessively interesting. It contains specimens of sixty-one species, seven of which are new to science. Among them are *Tricholæma stigmatothorax* and *Trachyphonus erythrocephalus*, two barbets recently described from Masai-land and U-kama; a new species of bush-shrike (*Dryoscopus*), very unlike any previously known, with a bright red crown; *Uraginthus ianthinogaster*, a beautiful violet-breasted finch recently described from Masai-land; and four species of glossy starlings (*Cosmetornis regius*, *Speculipastor bicolor*, *Notanges hildebrandti*, and *Spreo albicapillus*) of great rarity, and confined, as far as at present known, to the northern portion of the East African sub-region.

Lepidopterous Insects.—Mr. A. G. Butler, Assistant Keeper of the Zoological Department of the Natural History Museum, has examined the collection of Lepidoptera. There are forty-six species, two of which belong to the section *Heterocera* and the remaining forty-four to the *Rhopalocera*. Not fewer than seventeen are new species, one constituting a new genus. The most interesting novelties are *Neocænura duplex*, *Acraea mirabilis*, *Spindasis Somalina*, *Teracolus ocellatus*, *T. proclarus*, *Synchlœ distorta*, and *Eusemia Thruppiæ*.

Previous to the reading of the foregoing paper,

The PRESIDENT (the Marquis of Lorne) said he had the pleasure of introducing to the meeting Mr. James and his brother, who, though young in years, were old African travellers, having been no less than three times in the Soudan, once during the reign of the late General Gordon. The Geographical Society were particularly proud of Messrs. James, considering them as sons of the Society, because they were among those gentlemen who had taken advantage of the system of instruction established by the Council, and had been under the training of Mr. Coles, to enable them to take accurate scientific observations. They were also under particular obligation to the Messrs. James, because in American parlance they "had the floor" last week, but with great courtesy and kindness had given it up to Sir Peter Lumsden. That was another reason why the Society would receive them with cordiality and listen to their paper with great attention.

After the paper,

Captain R. F. BURTON said they must all feel highly obliged to Mr. James for the admirable paper he had read and the excellent maps he had shown, which added so much to their knowledge of the almost unknown country of Somali-land. He wished particularly to acknowledge the kind way in which Mr. James had spoken of his (Captain Burton's) former labours. He had expected to hear something more about the old ruins in the country, and especially about the ancient Christian tribes, but in Africa strangers had two things to learn—in the first place what there was, and in the second place what there was not, and generally what there was not was more circumstantially reported than what there was. He had the pleasure of meeting Mr. James at Trieste before he set out, and had an opportunity of pointing out to him a few of the difficulties of his undertaking. He himself had always found that the great difficulty of exploring the sources of the Nile was in London, and the great difficulty of exploring Somali-land was in Aden. That the immense tract of land behind Guardafui should be practically unknown was not honourable to English explorers, but travelling there had been rendered almost impossible by the peculiar condition of Aden. The Adenites were a peculiar people. They had not many topics of conversation, and when an expedition was proposed, it supplied them with something to talk about and think of for a long time. They generally.

took a depressing view of what was going to be done, and they did not keep it secret. The consequence was, the Somali heard of it, and concluded that the travellers had not the approval of their Government, from which it was a natural step in their minds to consider it a point of honour to rob or murder them. Very few men had ever entered Somali-land without feeling a Somali knife or spear. In the spring of the present year he met at Trieste Dr. Philip Paulitschke, who was Professor of Geography at the University of Vienna, and who went into the Somali country with Dr. Hardegger. They succeeded in reaching Harar without any particular difficulty, and were able to go still further to the south-west. They told him that Mr. James's expedition had run great risks, and that all kinds of reports had been spread about their having no weapons, whereas they were perfectly well armed. Mr. James had brought out his gallant little party without a fight, and that was very peculiar in Somali-land. In the autumn of 1854, after he (Captain Burton) had explored Harar, a little Timbuctu in East Africa, he proposed to set out for the sources of the Nile, which were then supposed to lie somewhat north of the Equator, and to march directly upon them from Berbera. The reason why for 2000 years travellers had failed to reach the sources of the Nile was very simple. They went up-stream, and by the time they arrived at the difficult part of the journey they had expended their stores and lost very much of their health, strength, and energy. He need hardly say how that expedition ended. Lieutenant Stroyan was killed, Lieutenant Speke was very severely wounded, and, in fact, the expedition was completely broken up. He afterwards renewed his attempt from Zanzibar, and on that occasion was more fortunate. All this was told in a book, 'First Footsteps in East Africa,' that came from the press almost stillborn, except that it was subjected to the caresses of a certain genial journal which was then called the 'Saturday Reviler'; but when his Highness Ismail Pasha determined to annex Harar, his heroic friend the late General Gordon made use of it, and wrote him several letters on the subject, sending him a history of Harar in Arabic, which he proposed one day to translate. He had been telling a story of thirty years ago: his excuse must be that it was so old that perhaps it might be new to some who were present.

Mr. RAVENSTEIN said he hoped that Mr. James would include in his paper the name of Cruttenden, of the Indian Navy, who was really the pioneer explorer of Somali-land. He was the man who so long ago as 1848 stood on the top of Mount Airansit which bordered the great inland plateau and looked down over the broad valley of the Tug Darotr, which ran to the east. Those who remembered what he said about six months ago, or who had read his paper on the subject, would know that the whole interior of Somali-land until within the last few days might very properly be described as a *terra incognita*. It was the most extensive region in Africa yet unexplored, stretching away from the borders of the Indian Ocean almost to the Upper Nile and the Victoria Nyanza. The map before them was not merely a hearsay picture by a sporting traveller or an amateur, but was based upon scientific observations, and they must therefore feel most grateful to Messrs. James for having undertaken the expedition. The route from Berbera led into the very heart of the country, and Messrs. James had given the correct positions of places concerning which a great deal had been heard, and afforded materials for reconstructing the map of the whole country. They were fortunate in reaching the river Shebeyli and so interesting a region. Throughout the districts of Somali-land, the Galla country, and the Masai country there were scattered agricultural communities of a race strangers to the nomad masters of the country. One of these communities would no doubt be described in Messrs. James's book with much more detail than had been given in the paper. He had never before heard the name of Adone applied to those people, though the name of the Hawiya Somal tribe who governed them was perfectly

well known. They spoke a language similar to that used along the coast, by which he supposed was meant Ki-swahili. Other communities existed at the back of the Wébe, such as the Bön and similar tribes. Mr. Cust included them under the term of "servile tribes." Further south there were the Wa-tua and Wa-sanía, living under like conditions, but what language they spoke was not known. Those who had seen them and spoken with them stated, as Mr. James did, that they spoke the language of the pastoral tribes. Dr. Fischer said that the Wa-sanía spoke Galla, and Mr. Wakefield said the same, but they were black people, and it would be interesting to find out where they came from—whether they were relics of a negro population, the bulk of which had gone to the south, or negroes that had gone to the north. Many among them were no doubt escaped slaves. Mr. James's expedition had really rendered an immense service to geographical science. There was another expedition into the same region which had also vastly assisted in increasing our geographical knowledge of the country. Harar was a town which Captain Burton first visited, and it was from there that Sacconi, an Italian explorer, started with twelve men towards the south. He was not a man who had undergone the excellent training which the travellers of the Geographical Society received from Mr. Coles, and although he sacrificed his life as an explorer he yet rendered very little service, because he would not take the trouble of learning how to observe an altitude or determine a latitude. Sacconi stopped at a little rivulet which he called Sulu, which simply meant river. He (Mr. Ravenstein) supposed that a good many names on the maps were simply no names at all. Sacconi was murdered. About the same period there travelled south for commercial purposes a Greek named Panagiotos, whose firm had also an establishment at Kassala. He also was murdered; but a Frenchman who travelled in the service of the house of Bardey and Co. succeeded in coming back from the Ogadayn country. He, however, communicated no geographical information, and therefore his journey possessed no interest for the Society. Captain Burton no doubt would be delighted to hear that another expedition had visited some ancient ruins. Dr. Von Hardegger, a sporting man, asked Professor Paulitschke to accompany him. They left the coast at Zeila and proceeded to Harar, where they stayed three weeks and most carefully determined the position of the place. They made several excursions from there, and visited the little lakes to the west of that town, which Father Taurin had described. Near one of those lakes a French traveller had been killed, and that was really the fate of nearly every white man who ventured into the country. It was all very nice for apostles of gentleness to quote "Do not raise your hand," but he supposed it was necessary at least to show that the travellers could defend themselves if they were attacked. After these excursions Professor Paulitschke and Dr. Von Hardegger went south. In the country of the Ania Galla they came to an old ruined city called Bia Woraba, and would no doubt furnish a description of it. Professor Paulitschke had informed him in a letter that he had collected a vast mass of information, and it would at once be perceived that having a good route on the west side, Sacconi's in the centre, and now Mr. James's route, it would be possible to reconstruct the map. He could only add that geographers owed a debt of much gratitude to Messrs. James for having combined their amusement with such valuable scientific work.

Captain WHARTON, R.N., said he had come into contact with the Somalis down near Kisimayu, which was just on the Equator. Some years ago he was on board one of Her Majesty's ships making charts there, and the first thing he was struck with was the magnificent physique of the Somalis. He really thought they were the handsomest race of men and women he had ever seen. They were black, but those who had lived in Eastern countries would agree with him that they might be black

and comely. Probably not even the Masai were a more magnificent tribe. He went to Kisimayu to survey the place. He had no doubt that Kisimayu would be heard of some day, as it was the first harbour to the south of Guardafui. Some more journeys like Mr. James's would, no doubt, very soon open up the country, and then the harbour would be made use of. There is a small fort there belonging to the Sultan of Zanzibar, who holds the country, but being on the borders of this warlike tribe his orders are not always regarded by them, as he soon found out. He had letters from the Sultan to the governor of the fort, directing him to give every facility. His officers landed to commence their operations. He had taken great precautions not to hurt the feelings of the Arabs, and he hoisted the Zanzibar flags as marks; but when his officers were standing round their instruments going on with their work, they suddenly became aware that they were surrounded by 300 or 400 savages armed with spears, who said, "You must go; we cannot allow you here." The officers replied that they had come there by permission of the Arabs, but the answer they got was "You must go;" and the savages took the officers and their instruments and rifles and literally carried them down to the boat, which they pushed off, and then waved "Good-bye." That night the beach was alive with fires, and there were at least 5000 natives gathered together. He sent to the Arab sultan to know what was the meaning of all this. The answer was, "If you will give me the word I will fight them;" but he said, "No. If we cannot survey the country peacefully, I am not going to give you the word to fight;" because he would have had to fight too. In the meantime our survey went on on the water without any delay. After four or five days the Somalis got rather tired of sitting down on the beach before their fires and singing songs, and at the end of nine or ten days a deputation came on board to say that they were exceedingly sorry, that they had made a mistake, but that they thought we had come to take the country as another expedition had done a few years before, and that they were too good friends with the Sultan of Zanzibar to allow any one else to have it. There was no doubt that it was an exceedingly difficult region to travel through, but Mr. James and his brother had got more than half-way through it. Captain Burton thirty years ago only succeeded in getting a few miles from the coast, but he hoped that before long other travellers would find their way easier because Mr. James had not fired a gun at the natives, so that future travellers would no doubt be able to complete the journey.

Captain STEWART KING said he had lately come from Zeila, 120 miles south-west of Aden. It was a port in Somali territory, and had lately been taken under British protection, which extended from the head of the Gulf of Tadjura to a little east of Berbera. Zeila was the port from which Burton started in 1854 on his expedition. Captain Burton's name, as Hadji Abdulla, was well remembered at the present day, and one person there told him that he had repeatedly knelt beside Burton in the mosque on Fridays without being in the least aware that he was a European. Captain Burton's description of the country was perfectly true at the present day. In his account of his visit to the Island of Sa'du-d-din, a mile and a half from Zeila, Burton mentioned several curious graves, and among others, one marked by a large millstone. He himself had seen that grave several times, and had been anxious to ascertain if there was anything in it; so he went there once with some natives with pickaxes and shovels to excavate. He was told there was a large treasure there guarded by a djin, and anybody trying to excavate there would certainly meet with his death. However, he said he would run the risk if they would point out where the treasure was. He dug around the stone and moved it, but found nothing. He then excavated a Galla grave a short distance off, and about three feet below the surface he came upon a flooring of concrete, on which was

the body with its head to the east and its feet to the west. It was so old that the bones and skull fell to pieces in his fingers. In another Galla grave he found pink coral beads and a woman's hair-pin made of ivory. The flooring of these graves must have been prepared previous to the person's death, as it would take several days for the mortar to set. There were no sides to the graves, but over them were heaped up conical heaps of stones, while outside were circles of loose stones. There was also generally a headstone, which about three or four feet above the surface of the ground was cut in the form of a cross, or had a cross cut on it with a chisel. There were also certain concave marks cut into the stone in parallel rows, reminding one of a game commonly played in the Somali country. No one knew what the meaning of these hollows was. Probably they represented the date of the person's death, as the language of the Gallas was unwritten. In one place, on the road to Ras Jibuti, where tradition said there was formerly an immense Galla city, there was a large knoll formed by loose rocks. It was not a natural hill, but the remains of some buildings. The stones were very large, with markings on them, all carefully cut with a chisel. The graves always ran east and west, somewhat resembling those of Somali chiefs, but pointing in a different direction. There was also some difference in the surrounding circle of stones, the Somali chiefs outside the outer circle having a number of stones ranged side by side, representing the number of persons killed by the deceased during his lifetime. At one grave near Zeila he counted sixteen. On his return to Zeila in August next he meant to further investigate the subject of Galla graves, as he believed that the relics found there would afford a clue to the past history of the people. The natives had told him that in the hill called Ailo about three days' march south-east from Zeila, there were remains of ancient cities, and substantially built houses, which tradition said were Persian. He hoped to be able to visit them. The whole country south-east of Zeila, inhabited by the Gadabursi tribe, had never yet been explored by a European. There was also in the hill Ailo a celebrated cave, which had been described to him as having a small entrance about three feet from the ground in the face of the limestone cliff. He had spoken to two or three men who had been inside it. They stated that they climbed up and entered with difficulty through the small opening; they then went down some steps and found themselves in an immense cave with a stream of water running through it, but pitch dark. A story was told of a Somali who once went into the cave and lost his way. In order to guide him out the people lighted fires outside, and he came out and told most extraordinary tales, stating that he found a race of men there who never left the cave, but had flocks and herds. On being asked what language they spoke, the native said it must have been Somali, or the man would not have understood them. Before many months were over he meant to explore that cave. He had been told that in the *Saturday Review* about a year ago there was a leading article on the concave marks in the stones, and he should be glad if some gentleman could give him some information on the subject. He had found Galla graves also in the Warsangeli country, far east of Berbera. M. Révoil in his book on the Somali country mentioned these, but the natives prevented him excavating there.

Sir Rawson W. Rawson said that within ten days a British steamer would be on its way out to establish a commercial business along the whole northern coast of Somali-land, from Zeila to Cape Guardafui. She would visit the principal ports, and collect the produce of the country. The gentleman who had undertaken this enterprise and would have charge of the steamer was Mr. Hay, of Liverpool, who was present at the meeting, and who no doubt, seeing the interest attaching to the country, would avail himself of every opportunity of collecting information with regard to the interior, and ultimately, perhaps next year, give the Society the benefit of his inquiries.

The PRESIDENT said he believed most administrations in Great Britain from the time of Queen Elizabeth to the present had had this in common, that they were glad to take any credit or glory accruing from explorations, but were averse to taking the responsibility for them. He did not mean to compare Lord Granville to Queen Elizabeth, for she allowed her explorers to go out without a word of warning, but Lord Granville seemed to have sent a message to stop Mr. James, and found how hard it was to stop the travellers of the Royal Geographical Society. He wished his Lordship had been present to hear how justified he was in imagining that there was great danger in trying to penetrate into Somali-land, and how successfully Mr. James had eluded Government pursuit and returned safely. He would also have learned how very dangerous it was to send open telegrams into the interior of Africa. He was sure they would all join in the wish expressed by Sir Rawson Rawson that the steamer might serve to open up trade. Now that there was a British garrison at Berbera confidence would be given to traders, and traffic with the interior would be promoted. They would all concur in thanking Mr. James for the account of his most interesting journey.

Journey from Quillimane to Blantyre.

By HENRY E. O'NEILL, F.R.G.S., H.M. Consul, Mozambique.

(Read at the Evening Meeting, February 9th, 1885.)*

I LEFT Mozambique on April 3rd, 1884, in the S.S. *Dunkeld*, arriving at Quillimane on the 6th. My stay at Quillimane was a short one, and as the *Zulu*, a small steamer, was prepared to proceed up the Quaqua, the morning of the 9th saw us on our way westward, *en route* for the interior. As the *Zulu* drew six and a half feet of water—probably more than any other vessel that has passed up the Quaqua—it was extremely doubtful how far we should get in her, and we were agreeably surprised to find that there was sufficient depth to take us up to the Dutch factory at the entrance of the Mutu river. A running survey, with a regular line of soundings, was made of this river during our passage by Captain A. Ewing of the Natal Shipping Company, and a copy of this, very kindly sent me by him, I have already placed at the disposal of the Council of the Society.

I will not delay or weary by attempting a description of the oft-repeated passage of the Quaqua to the Zambesi. Vast swamps, varied by tracts of low-lying and nearly dead level country of rich and fertile soil, but of a most uninteresting character, are all that meet the eye, whenever the country breaks into view from behind the fringe of reeds and mangoes that line the river bank. This portion of the delta is, nevertheless, fairly populated, and I was told that a thriving trade, chiefly in amendoim (*Arachis hypogæa*), was driven by the Dutch factory, and other petty trading stations established upon it. We left

* The paper is printed as abridged on reading at the meeting. For map of route see July No., *ante*, p. 496.

the *Zulu* at the entrance of the Mutu, and after passing a night at the Dutch house, where we were quite regally entertained by the agent, Mr. Teixeira, we entered boats and proceeded on our way to Mopea. Here we arrived on the night of the 12th, having performed in four days, thanks to the aid of the steamer, a journey that generally occupies from six to eight.

A short stay at Mopea, at the house of the hospitable director of the "Zambesi Opium Company," enabled me to look over the plantations, which were just then being prepared for seed. The formation of this company, seven years ago, excited some interest among those interested in the growth of opium in India, as it was feared that the enormous concessions granted might enable it to compete successfully with the Indian opium trade. A grant of 50,000 hectares, and freedom from all export duty for a period of twelve years, gave this company every chance over our Indian opium growers, handicapped as they are by a Government monopoly and an almost prohibitive duty. The estate, situated upon the southern bank of the chain of lakes which nearly connects the Mutu with the Zambesi, was of very large extent and of rich alluvial soil. But it represents in size a very small portion of the ground made over to the company by the Lisbon Government. In the immediate neighbourhood the company holds a sway, more or less real, of a large tract of country which extends northward to the Morambala mountain, and is called the "Prazo d'aquem Chiré." The concession carries with it tangible advantages, for every resident, whether black or white, has to pay a regular tribute to the lessee of the estate. This in the case of the natives amounts to 800 reis (3s. 4d.) per annum for each adult-male, and where thousands reside upon an estate, it forms an important factor in the income of the lessee.

It has been told me by some who are well conversant with the working of this system that it leads to frequent abuses, and that the amount exacted from the natives in many cases far exceeds that which Government has laid down. This is not improbable, for the tax collector is not a Government official, but the lessee himself, and it is to be feared these estates are too often rented with the view of extracting from the natives the profit which in most countries is expected to be obtained from the soil. In saying this, I do not, however, wish to include the estate of the opium company, which was, I believe, managed upon very different principles. Although the situation of the opium estate was good and the grounds well laid out and carefully irrigated and tended, the company has never paid a dividend, and it is generally acknowledged that the recent destruction of the estate by the Machinjiri rebels has only caused the enterprise to collapse a little earlier than it otherwise would have done.

I had to put up with a most vexatious delay at this stage of my journey. Driven to camp on the northern bank of the Zambesi at Maruru, I had little else to do but to study the action of its current and

to speculate upon its effects on the adjacent country and on the mouths of the delta.

The Zambesi has been making at this point, of late years, a great change in the direction of its course. Away to the southward and about six miles from the position where I had camped, is a long swampy lake, which formerly formed the course of the river. Some obstruction in the bed, possibly a granitic ridge, like those which are to be seen in every part of this country, or perhaps a silting up of the old channel, deflected the course of its waters to the northward, and the old bed was left as a still lake or backwater, filled now, I am told, only from its eastern extremity. This alteration, of course, has been making great havoc upon the northern bank of the river.

Day by day the rush of waters deflected, as I have before described, against that bank, has torn and still continues to tear away the country which separates the Zambesi from the Mutu and Barabango and other swampy depressions that drain into the Quaqua or Quillimane river. Two years ago the African Lakes Company purchased a house at Maruru which stood 800 or 1000 yards from the river bank. When I visited it in April last the river was running swiftly past its front walls, the foundations of which it has already sapped. The front rooms had fallen in, and only the back part of the house was habitable. The agent of the company had shifted his station back another thousand yards.

It may not, I think, be unreasonable to conclude that this constant wearing away of the northern Zambesi bank and gradual alteration of the course of the river will make in the future considerable changes in its delta and in the depth of channels now navigable, like that of the Kongone. For if a constant connection be established between the Zambesi and Quaqua and a large proportion of the volume of water now carried to sea by the Kongone and other smaller branches to the southward enters the Quillimane river, the effect will undoubtedly be to block the southerly channels by the precipitation nearer shore of the earth particles carried down by the river. And on the other hand the Quillimane river would be deepened by the greater "scouring" force of the larger volume of water carried down by it. In considering the possibility of this change, the low level and flat nature of the country between the Zambesi and Quaqua should be remembered, and the fact also that an inundated Zambesi even now establishes, though but temporarily and in a slight degree, the connection of which I speak.

After a weary delay of fourteen days sufficient men were obtained to man three boats, in the fastest of which I took passage with Mr. Morrison of the African Lakes Company. With our boats heavily laden with calico, beads, &c., we left Maruru on the 1st of May for the Portuguese settlement of Chironzi on the Shiré, the furthest point to which our men would consent to go.

The mode of travel on these rivers has not altered since Francisco

Barreto toiled up three and a half centuries ago for the conquest of Monomotapa and laid down half his expedition upon one of the Zambesi islands, travel-worn and fever-stricken, before they had half reached their destination. The curious part of it is that no attempts seem to have been made to improve the description of boats employed upon these rivers, or to adapt them to the special conditions of a river service. Boats that might well serve for carrying cargo upon a still-water canal, are called upon here to combat a powerful river current which at times reaches a velocity of five and six knots. It was in one of these that for eight days we struggled against the Zambesi and Shiré currents. Propelled at times with oars, at times with paddles, at times pulled along shore with the crew harnessed to a rope, not unfrequently swept off into mid-stream by the strength of the current, turned like a top and compelled to make for the shore at a point some hundreds of yards lower down, our progress was, to say the least, a trial of patience. The speed quickened in passing through to Morambala marsh, and when abreast of the mouth of the Zie-zie, for here the river widens to a great extent and the current slackens. It may not be generally known that the Zambesi above its junction with the Shiré is rarely used by trading boats going to and from Senna, and that the Zie-zie forms now the usual route. The Dutch house of Handels-Compagnie are running a steamer regularly by this branch and her captain informed me that, having tried both routes, he finds the Zie-zie deeper and freer from sandbanks than the Zambesi. When we passed through the Morambala marsh it was, upon the eastern side, well-nigh blocked with vegetation, and it was with difficulty and only with the aid of a native pilot that we threaded our way through the narrow channels that ran through these floating islands.

On the 7th we touched at Chiwanga, which is the first village to be seen above the marshes, and on the 8th we arrived at the fortified settlement of Chironzi, the residence of the military commandant of the district, by whom we were most hospitably received.

During the past two years the Portuguese have made some great strides up the Shiré river, and towards Lake Nyassa. In 1877, Captain Elton, in passing up, pointed out that no jurisdiction whatever was exercised by them north of Morambala mountain, and that the projected custom-house at the confluence of the Zambesi and Shiré would form a fit frontier post. Since then, the country called Machinjiri has been annexed, and two points occupied on the Shiré, Chironzi and Mpassu, the latter of which takes them close to the Ruvo river. The death of their old enemy, Chipitula, who since 1866 has been strongly intrenched on the islands at the mouth of the Ruvo, will facilitate their advance, and doubtless they will soon shake hands with the English at their stations on the Shiré highlands and Lake Nyassa.

We had now to prepare for our journey overland to Blantyre. The news we received from Mpassu only confirmed our men in their deter-

mination not to venture nearer the Makololo country. In our efforts to obtain carriers in Chironzi we were kindly assisted by the commandant, Captain Victorino Queiroz, who afterwards was massacred, with all his family, in the same residence in which we were 'generously entertained by him.

On the 11th we started for Blantyre. Our way was to lead us well east of the Makololo country about midway between Chiperoni (Mount Clarendon) and the Shiré river, and onward to the Milanji mountain by the hill of Manasomba, known to us through the members of the Universities' Mission, when first they settled in the country. From Milanji we were to strike north-westward to Blantyre.

Though parts of this country have been known to us, the route may be considered as new, and it certainly has never been marked on any of our maps. My chief desire in wishing to lay it down systematically was, that it promised to be a secure alternative route to that which led through the Makololo country. A walk of between five and six hours on the day we left Chironzi over an almost level and well-populated country, brought us to Matakanya's fortified residence. It was by this name that Mariano, the former holder of the Machinjiri estate, was known to the natives. The depredations of this half-caste, who kept many hundreds of armed slaves, in the country to the north of the Ruó, and the state of almost constant warfare which existed between him and the native chiefs north of that river, are spoken of by Livingstone and by members of Bishop Mackenzie's ill-fated mission. They have had the effect of comparatively depopulating a belt of country that lies north of this territory and driving the inhabitants of the plains to the hills. For between five and six days' journey after leaving Masago, a small village in the vicinity of Matakanya, we met with no sign of population except in villages perched upon certain hills—with one exception, and that was the village of Ntunda, which was strongly stockaded.

Although Mariano had been dead several years, his turbulent and predatory habits have produced the very worst effects amongst the people of the Machinjiri estate, and they have already proved a legacy of great trouble to the Portuguese Government. The commandant of the district himself complained to me of the unruly character of the people on this estate, and of the difficulty he experienced in getting them to work or pay tribute. Some of the most refractory he afterwards placed in irons and sent to Quillimane.

There have been many speculations as to the cause of the late determined revolt in this country. I think there is little doubt that the true cause lies in the unsettled and war-loving habits stamped upon these people by the practices of their former master. It was about here that the English traveller Faulkner was murdered.

The direction of our march from Chironzi had been north-easterly;

we now turned to the north-westward, and proceeded over a grassy, open, and lightly timbered country, crossing about four miles north of Matakanya's, a river called Missongwe, which was said to flow directly into the Shiré. About midday a village called Masogo was reached, lying close to a small hill of the same name. Thence an easy walk of between three and four hours brought us to Ntunda, a strongly stockaded village, within five miles of the Shiré, which we had again approached. The latitude of this village, by observation, was $16^{\circ} 43'$ south, and as the Portuguese settlement of Mpassu is almost on the same parallel, and that of the mouth of the Ruo is $16^{\circ} 32'$ south, it will be seen how far the Portuguese have lately advanced up the Shiré river.

After leaving Ntunda, we slept for two nights in the bush, seeing no sign of a habitation by the way, although the country was well watered, and the soil appeared fertile. We were now upon the Ruo drainage system, and upon our second day's march we twice crossed a fine tributary of that river called the Liazi. A perceptible rise was made at this stage of our journey towards the foot of the hill Mongwe, which we commenced to ascend on the morning of the third day. I cannot find this hill marked upon any of our maps, and yet its elevation cannot be less than 2000 or 2500 feet above sea-level. I had excellent views from it of the surrounding country, and I am told it forms a conspicuous hill from the Shiré river about its junction with the Ruo.

The ascent is rather precipitous, being worst upon the northern side. Its summit forms a small plateau, which is occupied by people of the A-nganja race, under a chief called Mlolo. He must be, I think, the Chemlolo spoken of by Mr. Rowley of the Universities' Mission, as he informed me that many years before he had lived in the plains nearer the Shiré, and had met the English when they first came into the country. From the place of his former residence he had been driven by the Makololo and had taken refuge upon Mongwe hill. Chiperoni, and another peak of equal altitude, unmarked, I think, on our maps, called Kanga, stood out grandly from the plains to the eastward, and to the north a complete view was gained of Milanji, almost overshadowing the hill of Manasomba, which lay between it and the point on which I stood. To the westward the Shiré could just be seen winding its way apparently at the foot of a range some 3000 feet in altitude, and upon a clear day a view can be obtained of the junction of the Ruo with it. Here my companion suffered a great misfortune. His carriers, forty-five in number, bolted for home, leaving, fortunately, their calico, and explaining—by proxy—the cause of their flight to be a fear to go further northward, for coming from Mariano's country, they were old enemies of these people, and were afraid of being killed.

There was nothing to be done but to push on to Blantyre with the few Ajawa men he had brought with him, and procure others to carry

up the goods. They were accordingly stored, and given in charge of the chief. As I had been suffering for a few days from fever, I agreed to wait here for a second party that was coming up from Chironzi.

In a couple of days Mr. Monteith, another employé of the African Lakes Company, arrived with a small party consisting of Ajawas brought down from Blantyre, and the next day we started for Manasomba hill, which formed our next resting-place. About fifty loads of calico and other goods were left stored in Mlolo, and in charge of the chief, and it is due to him to say that, though they remained at his village over two months—no good opportunity occurring to send for them—not a thing was missing or damaged when at last he was released of his charge.

We were now fairly in the plain of the Ruo and its tributaries, out of which Manasomba rises as an isolated hill. Travelling through it was no easy matter in the months of May and June, when the grasses are at their greatest height, and the ground is still wet and swampy. Our progress was a constant struggle with vegetation that had united overhead, and, partly fallen, formed a network breast high, through which we had to push our way. In many places the path was indistinguishable, and we wandered about over game-tracks, only preserved by the instinct of the guides from altogether losing our way. Manasomba, Mongwe, and other hills, even Milanji, which might have formed conspicuous landmarks, were completely lost to view. Our day's march, therefore, was as slow as well as fatiguing one, and in the afternoon we camped by a small stream about five or six miles south of Manasomba hill. It was unsatisfactory as well as weary work, passing through a district overshadowed, I may almost say, with the luxuriance of its vegetation, for nothing could be seen of the surrounding country, and were it not for the views we gained from the successive hills ascended on our way, I should have been able to say nothing of it.

At noon of the second day we reached the village of Mulira at the foot of Manasomba, and in the afternoon made the ascent to Mangasanji's village. The situation of this village could only have been selected for security, as it is with the greatest difficulty that the inhabitants find room upon it to fix their huts. Its summit is sharp, and forms no such plateau as that of Mongwe, and its sides are very precipitous. The huts of the villagers are fixed in every nook and cranny to be found around and about the boulders and crags that jut out from the sides of the hill. It was only by fixing my artificial horizon on a projecting piece of rock that I found room to take the sun at a low altitude.

Whether it was from the sense of security, imbibed from long residence in such a situation, that had given its chief Mangasanji the independent and arrogant air with which he received us, I cannot say, but his behaviour was very different to that of all the others we had

visited. I afterwards heard that he had gained for himself a reputation for rudeness and uncivility. From two parties of English who had previously passed him he had exacted fearful black-mail, refusing them guides until payment, and even then threatening to have them led into the country of Chipitula, with whose son we were still on unsatisfactory terms.

But he did not get more from us than his first legitimate present, though we had to play him a ruse in order to get clear of his village. Striking our tents at the very earliest dawn and giving the carriers their loads, we at the same time sent him a small parting present, receiving the answer we expected, that that was insufficient, and that we could not leave until we had given him a number of articles which he named. Before his messengers had half delivered his message, however, we had started our party down the hill; and though a number of men were sent after us, who endeavoured to block our way, they never proceeded to actual violence, and we succeeded in effecting a retreat which was, I must confess, more hasty than the nature of the country made agreeable. From Manasomba hill a perfect view is gained of the course of the Ruo as it winds its way through the plain from the eastern face of Milanji hill, where it takes its source. At the foot of Manasomba the Luchunya, one of its main tributaries, is seen to unite with it.

Cholo stretches its curiously level ridge, resembling rather a perfect tableland than the summit of a hill—away to the north-westward, and Chirazulu and other hills, whose names have been long familiar to us, come now for the first time in view. Our near approach to Milanji has given us also some idea of the beauty of its southern slopes, which are covered with vegetation of fresh and varied shades and form a striking contrast with the barren, rugged faces of the hill at their back.

Between two and three hours' walk brought us to the village of a chief called Chipoka, a pleasant old fellow, who welcomed us courteously, supplied us with a hut and sent us over a present of oranges, fowls, and eggs before even asking us whence we came and whither we were going.

To us, after tugging through the vegetation of the plain and splashing ankle-deep through its swamps (though the journey had been short, the state of the country had made the march very wearisome), this village, 2000 feet above the sea-level, with its abundance of food, pleasant mannered chief, and picturesque situation, was a land flowing with milk and honey. We would gladly have delayed here had it not been that we were anxious to know how our negotiations with the Makololo were progressing, and we felt also that our presence might be required at Blantyre.

Hard by Chipoka's runs a beautiful mountain stream called the Mloza, the waters of which rush over a bed of huge water-worn boulders, mingled with masses of moss and fern-covered rock, whilst overhead

gigantic creepers hang from the stems of trees, whose foliage, often interlocking, gave a deep, almost impenetrable shade. The whole formed a picture of most exquisite beauty, fitter indeed for the painter's brush than the traveller's pen. This stream is said to unite with the Kebula, an affluent of the Ruo, which was afterwards crossed by us.

Leaving Chipoka, we descended into a wide plain formed by the Tochira, one of the main affluents of the Ruo and its tributaries. This plain divides Mount Milanji from the Ndimas hills, which form the first ascent on the road to Blantyre.

In walking across the plain you gain a fine view of the western face of Milanji, and are able to see that the form of this mountain is quite unlike that given it on existing maps. It is generally represented as elliptical, with its longer axis in almost a due north and south line, but we could clearly see that its western face was far narrower than its southern, and though it forms, like most hills in Makuani, a huge, isolated, granitic block, its longer axis lies nearly east and west. The highest point appears to be at its north-west extremity, where a block, called by the natives Chambi, seems to have partly fallen away from the main hill, from which it is separated by a deep gorge, the sides of which rise up sheer, and bare of the smallest blade of grass, to a height of many hundred feet.

One night was passed on the Tochira, a broad stream flowing south-south-westward and uniting, it is said, with the Ruo a little above a point where the latter river, breaking through a bed of rock, forms a series of falls and rapids. These have never yet, I think, been visited by any European.

The next day we ascended the Ndimas hills and now found ourselves fairly upon the Shiré highlands. There is no very grand or striking scenery in these highlands, at least east of the Shiré. Hills of no great altitude and of easy ascent, divide pleasant, well-watered and fertile valleys, which are swept by fresh, cool breezes and enjoy a temperature that at night in the winter months frequently falls to 34° and 35° Fahr. None, I think, are at an altitude of less than 3000 feet above sea-level. The chief characteristic of the country, I should be inclined to say, is its habitableness. Hence to Blantyre we passed through a succession of villages or rather hamlets and saw huts on every side. All this, unhappily, is much changed since I passed over it, for it was upon this part of the country that the Angoni were working worst destruction until stayed by the appeals of the head of the Blantyre Mission. Further on, our path led us along the northern slope of the valley of the Licheza, which has its source east of the ridge connecting the hills of Soche and Pingwi, and flowing south of Malabvi, unites with the Tochira. Crossing this ridge we enter what may be called the Blantyre Plain, which declines slightly to the south-westward, and shortly after come into sight of the double line of eucalypti which almost

connect the Blantyre mission station with the Mandala estate. On the afternoon of the 29th of May we arrived at Blantyre, where I was most kindly received by the late Captain Foot, the Rev. D. C. Scott, and indeed every member of the mission community.

Journey from Blantyre to Quillimane.

By DANIEL JAMES RANKIN.

(Read at the Evening Meeting, February 9th, 1885.)*

ON July 22nd, 1884, Consul O'Neill, Mr. Henderson, of the Blantyre Mission, who was to accompany us a few miles, as he wished to fix on a site suitable for establishing a branch mission station, and myself, then a resident at Blantyre, started with twenty-three carriers, on our journey overland to Quillimane.

An hour's walk brought us to the south-eastern extremity of the basin in which Blantyre is situated. The country to the southward descends in long terraces, drained by the Lucheza stream, a tributary of the Ruo. Two hills, Pingwi and Bangwi, are passed on our left. A narrow valley separates the latter from a similar hill, Malabvi, on whose side we pitch our tent.

The morning turns out with a Scotch drizzle, and it is with difficulty we arouse the shivering carriers to face the wet wind over the eastern side of the hill and descend to the plain below. A five-mile walk brought us to the little group of Ndimba hills on the opposite side of the plain, due east from Malabvi; after toiling slowly up a very steep path, we arrive at the village. It is built on the extremity of a large boulder, jutting some distance out from the precipitous sides of the hill, and owing to its prominent position has the appearance of being suspended in mid-air, over the thickly wooded plain far beneath.

The shouts of drunken laughter issuing from the medley of huts warned us that a bout of *pombe* drinking was going on, and we began to fear we should not be able to get our men away from the great temptation of joining the carousers. Our bundles were put down inside the village and dinner discussed amid a large crowd of curious natives of all sizes, who kept up a continuous hum of conversation, criticising and commenting upon each operation in our simple meal.

Away to the north-east was the flat table mountain of Zomba; on the south-east Milanji peeped out between two neighbouring hills, its vast outlines melting and waning in the blue hazy distance, while below stretched away the Tochira plain, yellow and burnt with the hot sun, the course of its rivers marked with long waving threads of bright green.

* For map of route see *ante*, p. 496.

On the precipices overhanging the village were hundreds of monkeys, springing and leaping from the boughs of the trees and dashing helter-skelter hand-over-hand along the rope-like creepers.

Dinner over, we make known to the carriers our intention to start. To our astonishment further progress is met with a flat refusal. We are told that we are to go to certain villages named, and no others, leading us miles out of the direction we wished to take, and finally they informed us we were not to go overland, but by the ordinary route, the Shiré river.

This, of course, meant that the whole object of our journey was to be frustrated, and so summary a conclusion to our plans we naturally were determined most strenuously to oppose. These fellows, with innate cunning, knew that if they could get us some distance from Blantyre, we should in all probability be forced to concede to their impositions.

Seeing they would not be turned from their purpose by persuasion, Consul O'Neill wished to repeat the tactics he had successfully carried out in similar circumstances on his long journey to Shirwa the previous year. Accordingly, he and I went on before, carrying our guns, while our personal servants brought on our beds and some bread wrapped up in a cloth. Mr. Henderson, who seemed thoroughly disheartened by the mutinous conduct of the men, expressed his desire to leave us to shift for ourselves and he would return to Blantyre.

We descended the hill on the eastern face and struck out for the conspicuous landmark Milanji, leaving the men at the village with our loads discussing excitedly our strange mode of procedure and apparently undecided as to what course they should pursue. After passing through the gardens, we entered the Tochira plain. Some distance from the hill, by the side of the path, and in the centre of a little open patch that had been reverently cleared from the thick undergrowth, was the grave of a Yao chief. He had spent a wandering life, traversing this road at the head of caravans, and, by his own desire, his worn-out body was laid amid the scenes of its life's work, so that his spirit, delighting in its task, might toil on for ever.

The country now became more open and trees gave place to stunted bushes, while the long grass limited the view to a few feet. It was dark before we reached signs of water, and then only some in a small swampy depression. We turned aside to slightly raising ground covered with light timber, and set to work making a house of boughs and leaves. The servants had already lit a fire and were cooking our meal, for Mr. Henderson, who had changed his mind and shortly before overtaken us, fortunately never allowed himself to be separated many feet from the native who carried his *ntanga*, or provision basket.

Our little encampment soon presented a very cosy appearance and, under the shelter of the canopy of leaves, through the interstices of which the brilliant stars peeped in on us, we rolled ourselves in

blankets, waiting to see if our tactics would prove successful. And we were in no slight degree relieved when, at intervals, a black form would emerge from the surrounding darkness and slink to a shaded corner. The arbour of green was now lighted up by several bright ruddy fires around which squatted a dozen ebony figures with their feet placed almost inside the red glowing embers. From the impenetrable blackness around, came the deep roars of a score of lions; the tree-frogs and giant crickets croaked and whirred as if from a single monster throat, the denizens of the neighbouring swamp chiming in with their mellow, bell-like tinkle. The concert from the myriad-voiced orchestra around prevented us closing our eyes, till, worn out by the troubles of the day, the babel of roars, cries, and inharmonious sounds blended dreamingly into a confused distant hum and finally died away into the silence of deep sleep.

Next morning, at daybreak, we anxiously counted heads, but, to our disappointment, only half had turned up. Consul O'Neill immediately started off for Blantyre to obtain other men, leaving Mr. Henderson and myself in charge of the camp.

The day passed by very slowly, the few men with us gradually dwindled away—they were afraid to remain out alone in such a wilderness. Reports reached us that a chief ahead was going to attack us; the cowardly fellows discussed it with fear and trembling, so we were not surprised when we awoke next morning to find the fires gone out and the camp deserted; with the exception of my servant, every one had cravenly turned back.

For five monotonous days we kept solitary watch in the centre of this lonely plain, dreading the wild beasts on the one hand and hostile natives on the other.

On the fifth, Consul O'Neill returned, with only half the number of carriers we required. We had then the unenviable task of sending our surplus loads back, when each individual article seemed a stern necessity; this finished, we set off again and reached the sandy banks of the Tochira river by nightfall.

Early next morning (July 31st) without delaying to escape the heavy dew of the previous night, we struck our tent and were some miles on our journey before the sun rose. We were now approaching the boundary of the Tochira plain and ahead was a ridge of some 100 feet, which formed a water-parting to the Tochira and Kabula rivers, both affluents of the Ruco. Towering above us in front were the scarped walls of Milanji, below us its green slopes stretching far away, dotted with numerous huts and gardens. Close under the mountain we reached the Kabula river. Huge palm-trees threw their fringed shade on the blue sparkling water, richly hued creepers joined in waving festoons the thickly wooded banks; the torrent rushed hissing and roaring between the dazzling white boulders strewn in its path; thousands of

gorgeously clothed insects glittered and shone in the patches of sunlight, or alighted on the pretty moss-grown grottoes piled up along the margin.

A few minutes' walk from this charming little spot brought us to Chipoka's village on another lovely stream, the Mlozi. The village consisted merely of a score of huts surrounding the enclosure containing the chief's residence and harem; his subjects being scattered in hamlets for several miles along the steep slopes, on which they have their gardens. It lies at the foot of a pillar-like buttress of Milanji, which forms its south-western extremity; on its right is a deep ravine stretching far into the huge overhanging pile of granite; down its centre rushes, its seething waters hidden under a dark green covering of forest, the stream we have just crossed.

The natural tower that shadows the village has its head buried in a black storm-cloud, throwing a deep, angry looking gloom over the sharp crags and scarred precipices below. The gloom seems to creep stealthily down the wild weird-looking gorges as night comes on; the wind, as if stifled by the sultry atmosphere, mournfully dies away, and the dull roar of the falling torrent reverberates with a hundred echoes from the pitchy dark crevasses; at last the storm burst over us, and the huge volume of water suspended above falls away like a single sheet, the thick gloom is rent and torn with gleaming flashes of fire, and when the thunder peals forth it seems as if the mountain itself were being split asunder.

The next day proved brighter, and at noon I took a walk around. Under the groves of banana trees, half hidden by the broad leaves, were the little brown huts encircling the enclosure containing the chief's residence. Inside, orange trees grew in the richest profusion, diffusing a most delicious perfume from their load of blossoms. Tree-ferns added their graceful beauty, while towering over all, and seeming to vie in grandeur with the vast barren pile behind, were immense forest giants, standing up like the massive masts of a fleet of line-of-battle ships, their boughs hung with huge cable-like creepers. From the long grass peer out sugar-canes, pineapples, and many varieties of wild fruits, the free gifts of bountiful Nature. The soft coolness pervading the air after yesterday's storm, adds charmingly to the enjoyment of the picturesque surroundings.

On August 2nd, Mr. Henderson leaves us at 9 A.M., being most favourably impressed with the spot. We immediately get our guides and start for Machinjiri hill. We keep close in under the southern face of Milanji, our path being up and down the thickly populated slopes, crossing in succession the feeders of the Ruu river, Chumani, Nsuku, and Chiroi.

On the banks of the latter we came across a native working a primitive loom, very similar to that in use amongst the Egyptians; he

was producing excellent cloth about the thickness of canvas. His head was adorned with pieces of plaited cotton attached to his woolly hair, evidently the native mode of advertising. Further on we found a blacksmith surrounded by a number of baskets containing charcoal for his furnace.

The next stream was named Chanunka or "Stinking river"; but at the time we crossed it had no special smelling peculiarity. From the summit of a high ridge we looked down the deep ravine, at the bottom of which rushed the Lucheny river. Rising high up, on the summit of the granite slabbed mountain, in a scooped-out gorge, its head-waters fell in one continuous unbroken cascade, dashing with thundering din on the boulders 2000 feet below, among which it leaped and foamed with fearful fury.

From the ridge opposite we descend some 200 feet and enter a dense forest. The sun never penetrates here, a soft subdued shade takes the place of the bright glare outside. There is no undergrowth of grass, and no matter where we look, there is but a wilderness of intricate curves, twists, knots, circles, and every conceivable tortuous form, for Nature in this spot at least abhors a straight line. We hurry on and by 5 P.M. emerge from the darkness and enter more open country. The streams we cross are deeply discoloured with iron and the surrounding country seems impregnated with this metal. By nightfall we arrive on the banks of the Ruo river and enter Chumbuza's village.

We found it under a young man, then in a state of intoxication, who had only just received the dignity of chieftainship and was making use of his prerogative by an indulgence in every manner of excess and debauch. However, he gave us a house which was summarily cleared out both of occupants and dirt. Like all native houses, this one was infested with vermin, while the blinding smoke from the wood fire smouldering in the centre of the room, having no windows to escape by, rendered it impossible for any but a smoke-proof native to breathe more than 18 inches above the ground, so we had to lie under an atmosphere worse even than a yellow London fog.

Under a clump of banana trees in front of our dwelling was the newly-made grave of the late chief. From a pole fixed in the centre waved a few yards of brilliantly coloured handkerchief, the wealth of the deceased. Inside the little sloping roof of dry grass was a small oblong enclosure surrounded by a miniature mud wall a foot high. At the head was a small clay pedestal on which were two native cigars, a hollow pumpkin was filled with *moa*—beer—and in the centre were two heaps of flour or *ufa* made from maize, the staple native food. A few yards further off a burnt patch of ground marked the former site of the chief's house, all that remained being the mud-raised bedstead, which was religiously preserved.

After three days spent here in very unfavourable weather, we left

for Machinjiri hill, a spur of Milanji and forming its south-eastern extremity, half a day's march to the eastward.

A short walk brought us to the Mlozi river, an affluent of the Ruu, which it joins a little below Chumbuza's; its swift current caused some trifling delay in getting over. By noon we had ascended Machinjiri and rounded its southern extremity, turning up to the northward along its eastern slopes, the whole length being covered with gardens and hamlets. Near the northern extremity we obtained a hut for the night and fixed our quarters there.

To the eastward the country was very open and the view extended for many miles over a broad plain drained by an affluent of the Likugu river, the Lumanana. To the north-east were thickly clustered the hills of the Lomwe country, explored the previous year by Consul O'Neill. The plain was bounded by a continuation of these hills dotted with the conspicuous peaks of Zanga, Nkondeni, and one or two others of about the same altitude, while to the south-east Chiperoni mountain (the Mount Clarendon of our maps) stood out alone over the plain, another distant peak Kanga being visible on its left. The main caravan route, passing through Matapurri's, crosses the plain in a south-easterly direction.

The next day we were again subject to that greatest trouble of African travel—desertion. Already we had reduced our loads by half, and now four more men for some unaccountable reason left us. We procured substitutes here to go to the next village, Machemba, where we should join the main caravan road. At noon the following day we descended into the plain, reaching that village by dark, having crossed the Lumanana river and its feeders. The round mud-bedaubed huts we had been accustomed to see in the Yao country now gave place to neat square buildings of bamboo with fairly spacious interiors. The chief was sitting, when we arrived, on a cane mat spread in the centre of the village, surrounded by his dusky court. A monkey skin thrown over his left shoulder and a crown of eagle's feathers completed his insignia of royalty. We were given a house and spent the night there.

Next morning we found two more of our men had deserted; but by a little contrivance, we divided their loads amongst the others, though we still had three more loads than carriers; we succeeded, however, in getting that number from the chief, but not without prepayment, the demand for which being as unusual as it was suspicious. We started at last, but had only got three miles away, when these men put down their loads and refused to proceed a step further. We now found we had been taken from the main road to a friend of our late host, and they had undoubtedly planned this little ruse for the purpose of plunder.

However, by dint of bribing, the carriers were induced, as we hoped, to carry our loads to the next village. Our host's friend, who was greedily expecting the spoil, raised the most uproarious clamour on hearing this decision, and rushed about the village "shouting harm to us,"

as our interpreter put it. Seeing that further delay would only tend to bring matters to a crisis, we hurried our men from the village. We trudged on till noon and congratulated ourselves in getting away so quietly. We were now on the caravan road in the midst of thickly wooded uninhabited country. Arriving at a small stream for breakfast, the three carriers obtained at Machemba treacherously put down their loads and returned, leaving us where it would be impossible to obtain other carriers to replace them. We knew that our only safe course was to push on out of this unfriendly district, at all hazards. So without delay, we divided the surplus loads amongst our two personal servants and the interpreter, taking our share with the others, and struggled on till nightfall. Indeed Consul O'Neill had determined rather to burn the loads than to leave them to be plundered, as were they left behind the cupidity of the natives would naturally excite them to follow us for more. We pitched our tent among the burnt "massacasas" of a previous caravan, on the Luanza river, at the eastern extremity of the Lumanana plain.

During the afternoon we had passed the newly made grave of an Arab trader. It was sheltered from the rain and sun by a small hut open on one side for passers by to gaze in. A European cup was placed at the head. The whole was protected from the defilement of wild beasts by a strong wooden palisade. Close by was hung a tiny brush, that pious travellers might sweep away the decaying leaves blown on the little, lonely mound—a simple, but beautiful way of showing their respect for the resting-place of a departed, unknown brother.

Next day being Sunday, we remained in camp, and started by moonlight the following morning for a long uninteresting march through uninhabited, rolling, well-wooded country, arriving at Malopa about 5 p.m. The next morning saw us off again. We intended to stay at Mpassu, reported to be a town of some importance. A short distance off, we were informed exceptional honour was about to be shown us, for the chief had sent out his royal band to escort us to his capital. Very soon we heard the tinkle-tinkle of the *sansi*, vulgarly known as the "Zulu piano," a native instrument enclosed in the hollow of a large pumpkin, whose strains, until reinforced with a second, were drowned in the monotone tum-a-tum-tum of a Coast drum; the band suddenly redoubles its efforts and strikes up an inharmonious melody, when our near approach is announced. Crowds of eager sightseers joined in the procession as we advanced, increasing in numbers and noise when we entered the town.

Mpassu presents a striking contrast to the ordinary native village. Everything here has a touch of the coast about it. Instead of the tortuous windings among low mud huts, we have a rude attempt at making straight streets. The houses are superior, well thatched, roomy dwellings, immeasurably better than the ordinary smoke-

begrimed bee-hives of the country around. As it forms the headquarters of Arab traders, it is naturally strongly imbued with Arab ideas. The chief possesses large heavily carved doors of his palace, a latticed baraza, and a spacious courtyard. A large caravan under a native of Kilwa, Seyyid bin Ali, was at present staying here *en route* for Quillimane, and it was undoubtedly to his influence we owed our present reception. The little streets were thronged to suffocation, all eager to catch a glimpse of the first white men who had ever entered this town. And amid the terrific din of voices and unmusical instruments we were escorted to our residence, near the centre of the town. All that afternoon and during the whole of the time we remained there, the doors were blocked to excess with men, women, and children gazing on us with open mouths and distended eyes. The chief loaded us with presents of rice and sent us a fine goat. The town presented many curious illustrations of the superstitions of its inhabitants. Every house was fitted with an offertory for the presiding spirit, hung by the doorway; offerings of food, cooking utensils, umbrellas, cloth, &c., were put in some prominent spot in almost all the hamlets around, for the purpose of obtaining an abundant harvest. In the centre of the town itself was an open hut which contained a roughly carved figure of wood about two feet high, painted with black and white squares over its body; in front of it was an earthen vessel for the reception of offertories.

Our surveying instruments evidently aroused their superstitious feelings, for we began to hear from passers-by muttered exclamations of "sons of Shaitan," and indeed on the 15th of August we received a polite deputation from the chief to hint to us that our speedy departure was most desirable; accordingly next morning we continued our journey. I think it only right to mention here that Mpassu appears to have been one of the villages *en route* which Mr. Johnson omitted to visit. Our course was now almost south by east; a short distance from Mpassu we came to two hills, the one to the eastward being remarkable for its skull-like appearance, and was named by the natives "Mtu-wa-mata," or "shaven head." On the northern side we crossed the Mlungusi river which we had twice crossed between Malopa and Mpassu, and were told we should meet it again near the end of our journey. The people here turned out *en masse* to see us, and at their desire we stopped a few minutes to let them gaze more leisurely.

The country was now a succession of well-wooded undulations with every now and again huge granite boulders cropping up. By dusk we reached Mkula, where we remained the night. Next day but one (August 18th) we left the main caravan route, and after 2½ hours' walk over slightly undulating country we reached Chimbwa village, then in the course of erection. Next day we passed the sites of several deserted villages, crossing the Mwalisa stream, an affluent of the Liguquali. On the Rukananduo stream, an affluent of the Mlungusi, we came upon the still

burning embers of the former site of Chimbwa village, and also at this point reached the caravan road again.

We now enter a densely populated belt with villages at very short distances apart; the first being Namachili, under a son of Chiquasi; then followed Mpasu, Mbulu, and Murembi. An isolated hill, Irendeni, was passed on our left, and on our right, running parallel to our course, was the Tetema river, an important affluent of the Liqwali. At 5.30 p.m. we reached Mriamwendo, on the banks of the Telema, and a short distance to the westward of an isolated hill Chupanga. The country now assumes an uninteresting level which continues to the coast, dotted over with granitic boulders and isolated hills of some 200 feet. On August 21st we left Mriamwendo, immediately crossing the Tetema river, which here flows to the eastward. Two or three affluents of the Liqwali were crossed, a small village, Malama, reached at 10 a.m., and an hour later Chilemba. Here we found two small antique-looking cannons, and every evidence of this being a busy, industrious district. Traders with their long, yellow, bark-cloth covered bundles of oil-seeds were continually passing through on their way to Quillimane, and returning laden with coils of brass wire, calico, and beads. A hut was especially put apart for these, where the traders could rest and purchase refreshment, answering in every respect to our travellers' inns. Next day but one (August 23rd) we leave Chilemba, and by 8 a.m., after an hour and a half walking, arrive at and crossed the Liqwali river. It was then very much diminished in volume; but the great width and depth of its bed gave evidence of its magnificent proportions when flooded by the rains. By noon we reached Gerisa village on its left bank, where we found a Hindi trader, the first we had met. We crossed the Liqwali again, and fixed our quarters in a tumble-down shanty at the confluence of the Mlungusi and Liqwali, the two rivers meeting at our feet.

After two days here, we started on our last day's tramp for the house of a Portuguese half-caste, called by the natives Senhor Luna. The Prazo we were now on was rented by a Portuguese, Senhor Balthazar, and is called Prazo Buroro. The roads were kept in excellent condition, not unfrequently neatly bordered with well-kept rows of pineapples and other signs of artistic beauty, showing unmistakably that we were approaching the influence of civilisation. The superior state of the roads was, however, in a great measure counterbalanced by the wretched, filthy hovels that served the natives for houses. Nowhere along the line of route had we seen even the poultry, kept by the poorest native, sheltered in buildings so mean and shelterless. On every side we were forcibly reminded of the slavish condition of the people, who, though free in body, were still slaves in thought and action.

Near to Senhor Luna's we came across some curious instances of native superstition. At the cross roads, a model of a hut was placed

in which were seated three clay figures, six inches in height, one male and two female. The latter were shown in a state of pregnancy, while in the male an exaggerated representation of the *φάλλος* showed it to be a propitiatory offering to the spirit presiding over generation.

During our stay with Senhor Luna, that gentleman treated us most kindly, doing everything in his power to make us comfortable, and assist us in reaching Quillimane.

The journey hence to our destination is one long dreary continuation of swamp. From Senhor Luna's house we came down in a canoe, at times rushing madly along with the rapid current when it was narrowed to half its width, at times dragged slowly over the sandy bottom when it had lost itself in a swampy marsh. By dark we reached a house at the confluence of this river with the Makama.

A dwelling situated in the midst of scenery so utterly lonely and depressing, I think I have never seen. As we entered the little reach in front, the yellow sun was slowly sinking behind the horizon of tall rank reeds, throwing a sickly parting light on the muddy stream. We landed from the canoe, if loathsome slime deserves the name of land. For miles around all to be seen was a boundless extent of waste and dreariness, the death-like stillness harshly broken now and then by a startled distant cry from a denizen of some far off and unseen clump of reeds. We started off the same night, under a full moon, in an oil-seed carrier. Several villages on piles were passed, scattered along the banks. A short distance north of the Namakura river, the Liquali takes an entirely opposite direction, and for some two or three miles has a due northerly course. Quillimane is reached late at night on the 29th, and our journey accomplished.

The foregoing papers were read, in the absence of their authors, by the Rev. Chauncy Maples:

The Ven. Archdeacon FARLER said he could not say that he knew the country described in the papers as Mr. Maples and Mr. O'Neill knew it; but a few years ago he went down to Lindi with the late Captain Foot, in Her Majesty's ship *Ruby*, and there they explored the Ukaredi river. He had also been to the mouth of the Rovuma, at Mozambique and at Quillimane. From all he could gather it was an uninteresting country, almost desolate, being covered, except in a few favoured spots, with a dense scrub, and no depth of soil, while water was difficult to obtain. It was therefore not a country that was ever likely to be capable of European colonisation. Still, Mr. Maples, in his march from Masasi to Meto and back to the coast, showed that the people were fairly friendly, and Mr. O'Neill, whom he knew in 1878 as the first lieutenant on board H.M.S. *London*, and who succeeded Captain Elton at Mozambique, had certainly done a very great work for geography. Five years ago hardly anything was known of that great Makua country, but through the travels of Mr. Maples, Mr. Johnson, and Mr. O'Neill, the whole country was now open. Mr. Maples and Mr. Johnson had travelled in the north, and Mr. O'Neill had made several most interesting and important journeys more to the south, from Mozambique to Loangua and up to Blantyre, so that geographically there was very little more to learn. For a long time it was supposed Namuli was snow-clad, but Mr. O'Neill found

that it was not a snow peak, and that it was very much lower than was at first supposed. The lake written about by Mr. Johnson under the name of Kilwa was certainly the same name as Shirwa. He described it as the head-waters of the Lujenda river, but Mr. O'Neill thought it was not; and the more he (Archdeacon Farler) read on the subject, the more he could not help feeling that Mr. Johnson was right—that Kilwa was really the head-water of the Lujenda river. It was quite certain that Shirwa did not drain to the south, and as it must have some outlet it could only be concluded that it drained to the north, at least during the rainy seasons. It should be remembered that the Portuguese were supposed to have ruled from the Rovuma to Quillimane for more than 300 years, and yet nothing had been learned about the interior—no attempt had been made to civilise or to Christianise the people, no missionary had been sent from the coast; but now the work was being done by Englishmen. When he was at Mozambique, the Portuguese did not “dare” to do it, and Englishmen might well be proud that they were the first to “dare” to go into the country and lay it open to geographical knowledge. He was sure they would all thank Mr. O'Neill and Mr. Rankin for what they had done.

Sir FOWELL BUXTON said he only expressed what must be felt by all present when he said that the papers that had just been read were deeply interesting. No doubt Mr. Maples when he read the papers had in his mind the thought of what a great contrast there was to be drawn between the character of those people who had been for some period under the influence of half-caste Portuguese inspired by some of the traditions which had prevailed on the Zambezi, and their warlike, turbulent, and rough disposition, as compared with the population which had been brought under the influence of Englishmen at Blantyre. Evidently the mission at Blantyre had so far impressed the population about them that they and their territory remained safe when the surrounding country was invaded by marauders, and those who belonged to them appeared to remain in safety whether in their immediate neighbourhood or not. It was manifest, therefore, that the tradition which they were establishing was becoming a very important one, and now it was possible for Englishmen to travel there, whereas they could not a few years ago. It was true that Mr. O'Neill had travelled much more than Captain Elton did a few years ago, but probably that arose from the fact that the whole region had now learned something more of what Englishmen were like; and if that was becoming the result in that region, it would be acknowledged that it was in a great measure due to the experience the natives had had of Mr. Maples himself and his colleagues. The parts where Mr. Maples had been engaged were a year or two ago invaded and suffered considerable loss. His station was now threatened by the same tribes, but he could not but hope that those impressions which had gone abroad would so far intensify and become strengthened in the native mind that the Mission settlements, at all events, would be as strongly defended from attack as the settlement at Blantyre appeared to be. They must all wish all good things for Mr. O'Neill and Mr. Rankin, as well as for Mr. Maples himself.

The Rev. CHAUNCEY MAPLES said he should like to make a few remarks about the Angoni. Mr. O'Neill stated that they had made a dreadful raid, but were induced to retire at the instigation of the Scotch missionaries at Blantyre. These people were called on the maps by a good many names, sometimes Wa-machendi, sometimes Ma-kwangwara, sometimes Maviti, and sometimes Wa-angone. It had been asked why these people, who were certainly Zulu in origin, who spoke the Zulu language, who wore the Zulu head-dress, and sounded the Zulu “click,” were found in this country hundreds of miles beyond Zululand. The story was that the great king of Zululand, Chaka, who first organised that race into a military power, sent a large party to travel as far as they could to the north and to raid all the country. This

was supposed to be the origin of the Maviti in these northern parts. In 1880 he spoke to the late Sir Bartle Frere on the subject, and he (Sir Bartle) being very much interested in it, referred the question to King Cetewayo, who said it was a mistake to say that the Zulus had first gone to the north in Chaka's time, for when he was a little boy there was a tradition that they had gone up many years before, so that the Zulus in the time of King Cetewayo's boyhood knew that a large party had found their way to the north at a much earlier date. These Zulus were an important factor in the whole of the life of this part of East Africa. No traveller could pass through the country without coming across them in some way or other. Happy was the man who only had to make a detour of 200 or 300 miles to avoid them; less happy he who had to meet them out in the open, as he (Mr. Maples) had to do. Two years ago the Mission station at Masasi was raided by them, coming from the neighbourhood of Nyassa. When he was in hiding with his friend the chief Matola at Newala, not knowing whether his released slaves were killed or whether his colleague Mr. Porter was dead or alive, and fearing that the Zulus would climb up the escarpment of the Makonde plateau and kill them, a letter was brought to him by three coast people, and he saw that the handwriting was that of his friend Mr. O'Neill, who at that time was making one of his first journeys to explore the Maviha country, where the natives were said to be a very strange people. Mr. O'Neill arrived at a place called Chimsaka, about 90 miles from where he (Mr. Maples) was in hiding, and heard the story of the raid. Whereupon he wrote a letter in which he said that he had heard that the Mission station had been burned and the people killed, but that one of the missionaries was in hiding at Newala. He added, "If it is you or your friend tell me at once, and I will come across and share the worst. I have only a few men ill-armed, but I will come if you want help." Mr. Thomson had left some paper behind him, and so he (Mr. Maples) was able to write back that he believed things were not so bad as they were represented, and although he was unable to get away himself, he hoped in time to get back to his station, and was only suffering from hunger. Mr. O'Neill thereupon pursued his journey. As Sir Fowell Buxton had said, another attack was now expected. His colleague had just completed a remarkable journey to the Zulu villages at the very source of the Rovuma. Archdeacon Farler had pointed out the results of the exploration which led to the discovery of the source of the Lujenda, and it would be seen that these rivers united and ran together to the coast. Mr. Porter had visited the Zulus at the source of the Rovuma twice, and he reported that the country there was exceedingly beautiful. He spent three weeks there and found time to collect many flowers and plants. He was told by the people that they intended to raid the country again this year, but would spare his village and people. They had even fixed the time for it—as soon as the maize harvest was over. That would be about the middle of the month of May, and he (Mr. Maples) trusted to be out there in time to take some action. The paper showed that the influence of the Scotch missionaries had been of much use, and he hoped that the station at Masasi would similarly be useful, and that in course of time the Zulus would be induced to drop their old predatory habits and warlike ways, and follow the quiet, peaceful customs of the people in whose country they had elected to live, and would live. He must express dissent from some remarks made by Archdeacon Farler, who had spoken in too general a way of the features of the country between Nyassa and the coast. What had been said was true of a great part of it, but in a paper which he communicated to the Society some time ago he pointed out that that oasis in the desert, the country of Meto, was exceedingly beautiful. Mr. O'Neill had spoken in the highest possible praise of the country about the Namuli peaks, which reminded him of what Mr. Johnston told the Society only a short time ago about Kilima-

njaro. It was not quite correct to say that the whole country was bare, uninteresting, and mere scrub and desert, though a great part of it undoubtedly was. Major Serpa Pinto, whose book giving an account of his journey from the west coast to the east was probably familiar to all the members, intended to make another journey into the interior from Pomba Bay, in which case he would probably go to Meto, where he would meet with one of the most disagreeable specimens of humanity in Africa, the chief Mwaliya. With great difficulty he (Mr. Maples) escaped out of his hands three years ago, and he only hoped that Major Pinto would have less trouble with him. Mwaliya was the great centre of the whole country of Meto, from which the slave caravans radiated to the north and south, to the country not far from Mozambique, and to Chisanga. In some circles it was said that the slave trade was nearly at an end, but he emphatically contradicted that. Only two years ago he came across a caravan of 2000, and in still more recent times Mr. O'Neill had over and over again corroborated his statements. In conclusion, he wished to point out what a very great deal Mr. O'Neill had done towards opening up the country. As Archdeacon Farler had truly said, there was a time when it was said in Mozambique and Zanzibar that it was quite impossible for any traveller to penetrate into the interior, and even Captain Elton, who was not wanting in intrepidity, was never able to get beyond Pao Mountain, 30 miles from Mozambique. Since that time Mr. O'Neill had gone in repeatedly. It was impossible to say whether the country would ever be colonised by Englishmen, but a very large part of it offered a good field for colonisation and occupation. He said this on the authority of Mr. O'Neill, whose paper had just been read.

GEOGRAPHICAL NOTES.

The Afghan Frontier Commission.—The following is an extract from a letter received from Camp Tagao Robát, near Zirmast Pass, dated July 1885:—"We have, so far, worked through districts already explored more or less in recent times, either by the Russians or others, but we are now breaking comparatively new ground, where there ought to be much of historical as well as geographical interest. Since the completion of Badghis, a wide slice of Eastern Khorasan has been brought under survey, from Mashad to Khaf, and (turning eastwards) all the southern watershed of the Hari Rud valley as far as Obeh, as well as the Hari Rud valley itself (full of detail) and the complication of hills to the north of it, including the whole southern drainage of the Paropamisus. The northern basin (Kushk-Murghab, &c.) was already fairly complete. You will be glad to hear that Captain Gore has, after much trouble and delay, at last secured a most satisfactory determination of the longitude of the great dome at Mashad. The observations are so complete that we hope to have them published shortly. Mr. Schindler (the Director of Persian Telegraphs) assisted him at the Tehran end of the wire, and we have to thank him for the pains he has taken in the whole affair. A very complete series of observations for latitude was of course taken simultaneously. The result is all the more satisfactory

that we find ourselves at the end of the long line of more than 1000 miles of survey from India, with an apparent error of only 11 seconds in longitude, a result we hardly hoped for, although the connection with the Indian Survey is approximately trigonometrical. This involves practically no correction to our small-scale maps, and gives us a fresh point of departure for our run eastwards to Balkh or Badakshan. Captain Talbot has started to carry on triangulation to the head of the Hari Rud, with permission to proceed as far as Daulatyar. He will thus be within sight of the great central mass of the Koh-i-Baba, if he does not actually reach it, for I believe Daulatyar to be very much further east than it is generally marked on the maps. A native surveyor has started from Obeh southwards across the many apparently parallel ranges (quite unlike anything shown at present on our maps) between the upper Hari Rud and Gaur, or Zarni, from which place he is to turn northward again, plane-abling up to Daulatyar. Another native surveyor has started (or will do so very soon) for the Upper Murghab and Ferozkohi country to survey the direct routes to Maimana from Obeh, across the Band-i-Turkestan. I have seen from high points in this neighbourhood (we are camped on the Zirmast Pass, between the Zirmast and the Kashka *kotals*) a good deal to the south and south-east. The main range of the Paropamisus (about 8000 feet at this point) appears to fall towards the east rather than to rise, whilst the Hazara country southwards seems to be a system of high parallel ranges and open valleys. But we shall know more about it soon. The Amir seems to be exceedingly well disposed towards surveyors. Indeed he favoured me with a message through the Naib of Herat to the effect that he remembered me at Kabul, and appreciated our maps: so I do not really think there is any risk in pushing on as we are doing; I do not indeed see why we should not survey all Afghanistan at our leisure."

Forests of British India.—In a paper on the recently established School of Forestry in India, read in the Geographical Section of the British Association at the Aberdeen Meeting, the author, Major Bailey, stated that the area in square miles "of the forest of all classes in British India" was computed on the 1st of April, 1883, to be as follows:—

	Reserved forests.	Protected forests.	Village forests.	Total.
Bengal ..	35,667 ..	3,397 ..	18,428 ..	57,492
Madras ..	2,782 ..	.. ..	.. ..	2,782
Bombay ..	9,823 ..	5,178 ..	.. ..	14,996
Total ..	48,272	8,570	18,428	75,270 sq. miles.

Colonel Prejevalsky.—It appears from the latest telegram from Colonel Prejevalsky, dated Osh, August 31st, that this intrepid explorer has again failed to penetrate into Tibet over the Keria Mountains, in consequence of the strenuous opposition of the Chinese, who barricaded all the available highways with stones and destroyed the bridges.

New Siberian Islands.—Preparations are being made for the expedition under Dr. Bunge and Baron v. Toll, which will start next spring for Ustyansk, for the exploration of the New Siberian Islands, which since Anjou's journeys in 1821–3, have only been visited by the unfortunate *Jeannette* people for a few hours, on their route to the mouth of the Lena.

The Australian Expedition to New Guinea.—We have received from the Geographical Society of Australia a record of the proceedings in fitting out and starting the exploratory expedition to New Guinea. From this it is evident that everything has been done to secure the success of the expedition, and to obtain full and trustworthy information on all aspects of the region to be explored. It is this Society, it may be remembered, which presented Mr. Forbes with 500*l.*, though his work will be independent of that of the Society's own expedition. The commander, Captain Henry Charles Everill, has been carefully selected from a number of candidates, and his staff includes a naturalist, a surgeon, two sub-leaders, one on land, the other on sea, a photographer, three natural history collectors, a surveyor, engraver, and "general utility" volunteer. Very full instructions have been drawn out for the expedition, while considerable discretion is rightly left to the leader to adapt his operations to circumstances. The expedition was to enter the Aird river, which is probably only an east arm of the Fly river. As a matter of fact, a telegram in the London papers of September 22nd, states that the *Bonito*, in which the expedition sailed, has entered the Fly river, and will, in accordance with instructions, penetrate as far as possible into the interior. Unfortunately the *Bonito* must be in Sydney by December 8th. The instructions include directions not only for surveying work, but for observations on the natives, on zoology, botany, geology, with directions for the collection and preservation of specimens.

Further News of Mr. H. O. Forbes' Expedition.—Since the publication of the note in our September number, we have heard that Mr. Forbes has sustained a severe loss whilst in the act of embarkation at Batavia for his voyage to Thursday Island and New Guinea. The whole of his baggage, consisting of some fifty carefully packed cases, including his instruments, guns, ammunition, food, clothes, and trading articles, was lost by the swamping of the prahu which was conveying it from the pier to the steamer, he himself being on board. This disheartening catastrophe has necessitated some change in his plans. He intended to leave his thirty men at Thursday Island and go forward himself to Brisbane to purchase a new outfit. We are glad to learn, under the circumstances, that the British Association, at the Aberdeen Meeting, voted Mr. Forbes a further grant of 150*l.*; but this will not make good a sixth part of the pecuniary loss which he has sustained.

Dr. Finsch's Journeys in New Guinea.—Dr. Otto Finsch, the well-known explorer, has, as is known, recently returned from a sojourn in German New Guinea. Some of the results of his work he described to a member of the staff of a South Australian journal on his return homewards in July last. Dr. Finsch stated that he had traversed the north coast of New Guinea for a distance of 1000 English miles, from East Cape to 141° E. lat. (Greenwich). Several good harbours were discovered, and continuous meteorological and sounding observations made. Dr. Finsch compares the climate on the coast of German New Guinea with that of North Queensland. Both he and his companions enjoyed good health during their journeys. Dr. Finsch is of opinion that the country is well suited for European colonisation. The interior of German New Guinea is mountainous; the plains in the neighbourhood of the sea are richly covered with trees and bush and are well watered. The expedition discovered a large river, which Dr. Finsch named after the Empress Augusta; its course was followed for 30 English miles into the interior. There is evidence of the existence of many other rivers. Dr. Finsch could not penetrate very far into the interior, but wherever he went he found the soil of the richest fertility, the land being well suited both for agriculture and cattle. The natives cultivate considerable stretches of land,—sugar-cane, bananas, yams being among the articles they rear. Dr. Finsch saw no trace of minerals; the coast abounds in coral reefs. The reported discovery of gold on the Fly river he regards as a “Schwindel.” Of the natives he speaks well; they have no affinities with those of the neighbouring Australian continent. Although physically a subordinate race, they possess considerable intelligence and could easily be trained to labour. They were perfectly friendly to the explorers, and Dr. Finsch believes they will form no obstacle to the settlement of the country if properly treated. He has the best hopes of the future of the new German colony. He himself expects to return to the country after making arrangements with the German Government for its further exploration and settlement.

The Successor of King Mtesa.—After a long interval, letters dated May 20th, 1885, reached London (in August) from Rubaga, the capital of U-ganda, on Victoria Nyanza. Our readers will recollect that King Mtesa was succeeded by his young son, Mwanga, whose future policy and character were a problem of much interest to the few European residents. It is now stated that rumours having reached the king that white men had arrived in Ba-soga, on the north side of the Nyanza (probably our explorer, Joseph Thomson, and his companion Martin), his suspicions were aroused, and he arrested six native Christian lads who were preparing to accompany Mr. Mackay to the station at Msalala, at the south of the lake; three of them were subsequently liberated, but the other three had their arms cut off, were bound alive to a scaffolding, and slowly burnt to death. They died with great fortitude, not deny-

ing their new faith. At present the king and his prime minister are very friendly to the three Englishmen, and listen with marked attention to their instructions.—Bishop Hannington is working his way through the unknown region between Kilima-njaro and Victoria Nyanza, and hopes to be at Rubaga by the end of the year.

Departure of Mr. Last.—Mr. J. T. Last left England on the 2nd of September, on his way to Zanzibar, where he will equip his party for the expedition on which he is engaged, to the Namuli Hills and the Likugu river.

The Kassai Tributary of the Congo.—Lieut. Wissmann in his recent second journey of exploration has descended the Kassai, the great southern tributary of the Congo, and found that instead of entering the main stream, as hitherto hypothetically supposed, a little north of the equator, it joins it in $3^{\circ} 13' S.$ lat. At no point in his descent did he cross the third parallel of latitude.

Death of Mr. D. D. Veth.—We greatly regret to learn of the death of this able young explorer, on May 10th last, on the banks of the Kala-Kanga river, between Benguella and Humpata. Mr. Veth was leader of a Dutch expedition into Portuguese West Africa. He was the son of Prof. P. J. Veth, late of Leyden University, whose works on Sumatra and Java have given him a high rank as a geographer. The work on "Midden-Sumatra" embodied to a large extent the results of the expedition of which his late son was a member. The loss will be a great grief to Prof. Veth, who has only recently retired from his professorship in Leyden, after long years of hard and faithful work.

Oceanography.—One of the most interesting features of the Aberdeen meeting of the British Association was the lecture given by Mr. John Murray, director of the *Challenger* publications, on the results of deep-sea research. The following may be regarded as the general conclusions to which Mr. Murray has come from a review of all our knowledge of the subject. In the abysmal regions which cover one-half of the earth's surface, and which are undulating plains from two to five miles beneath the surface of the sea, we have a very uniform set of conditions. The temperature is near the freezing-point of fresh water, and the range of temperature does not exceed seven degrees and is constant all the year round in any locality. Sunlight and plant-life are absent, and although animals belonging to all the great types are present, there is no great variety of form nor abundance of individuals; change of any kind is exceedingly slow. In the more elevated portions of the regions the deposits consist principally of dead shells and skeletons of surface animals; in the more depressed ones they consist of a red clay mixed with volcanic fragmental matter, the remains of pelagic vertebrates, cosmic dust, and manganese-iron nodules and zeolitic crystals. It has not yet been possible to recognise the analogues of the deposits now forming in the abysmal regions in the rocks making up the continents, but it is quite otherwise in the areas bordering on the continents. Almost all the matter brought down to the ocean in suspension is deposited in this region, which is that of variety and change, with respect to light, temperature, motion, and biological conditions. It extends from the sea-shore down, it may be, to a depth of three or

four miles, and outwards horizontally from 60 to 300 miles, and includes all partially enclosed seas, such as the North Sea, Mediterranean, Caribbean, and many others. Plants and animals flourish luxuriantly near the shore, and animals extend in relatively great abundance down to the lower limits of the region. Here we find now in process of formation deposits which will form rocks similar to those making up the great bulk of continental land. Throughout all geological time the deposits formed in this border or transitional area appear to have been pushed, forced, and folded up into dry land, through the secular cooling of the earth, and the necessity of the outer crust to accommodate itself to the shrinking solid nucleus within. The changes in the abysmal region, though great, are not comparable with these. Coral atolls and barren reefs, Mr. Murray thinks, instead of pointing out great and general subsidences, must be regarded rather as indicating areas of great permanence and stability. The results of many lines of investigation then, according to Mr. Murray, seem to show that in the abysmal regions we have the most permanent areas of the earth's surface, and he is a bold man who still argues that in tertiary times there was a large area of continental land in the Pacific, that there was once a Lemuria in the Indian Ocean, or a continental Atlantis in the Atlantic.

The Perthes Centenary.—On the 11th of September occurred the centenary of the foundation of the well-known geographical establishment of Justus Perthes of Gotha. The Committee of the Geographical Section of the British Association, which was in session at Aberdeen at the time, sent a telegram of hearty congratulation and good wishes for the future to the head of the establishment. All the professors of geography at the German Universities united in presenting to the firm a beautifully illuminated address, expressing their sense of the services rendered to geography by the firm during its long career. A handsome quarto volume has also been issued from Gotha (for private circulation) giving a very interesting sketch of the progress of the establishment under its various heads, brief biographies of the famous cartographers connected with it, and notes on the various great works in geography which it has produced. The work contains numerous portraits both of the partners and cartographers of the past. The founder of the firm was Johann Georg Justus Perthes, who was born at Rudolstadt, September 11th, 1749, his father being physician to the Prince of Rudolstadt. When the firm was first established in Gotha in 1785, its publications were of a general character. In 1809 the great '*Hand-Atlas über alle bekannte Länder des Erdbodens*,' by Professor Heusinger of Dresden, was published, with 24 maps in copperplate. Under the second chief of the firm, Wilhelm Perthes, 1816–53, the Gotha establishment rapidly assumed the special geographical and cartographical character it has ever since possessed. Under him the first part of the celebrated *Hand-Atlas* of Adolf Stieler was published in 1817, which since then has continued to be issued in an unbroken series of editions. To Wilhelm succeeded in 1853 Bernhard Perthes, who, however, was cut off in 1857, leaving a posthumous son, the present head of the Gotha establishment. The successive chiefs gathered round them in successive years all the best geographical talent in Germany, including such names as those of

Stieler, Berghaus, Sydow, Spruner, Bretschneider, Petermann, Behm, Wagner, Supan, Hassenstein. Through the 'Geographische Mitteilungen' established by Petermann, the Gotha establishment has gradually become the receptacle for geographical information from all parts of the earth, information which is being constantly put on record and given to the world in the form of those accurate and beautiful maps with which all geographers are familiar. We must all agree in wishing continued prosperity to a house which has done such admirable service in the past to geographical science.

Geographical Education.—Dr. Richard Lehmann, professor of geography in Münster University, has issued (Tausch and Grosse, Halle a. S.) the first part of a work which will extend to about 400 pages, on *Apparatus and Methods in Geographical Teaching*—"Vorlesungen über Hilfsmittel und Methode des Geographischen Unterrichts." Dr. Lehmann has given great attention to the subject of geographical education, and has himself, as teacher and Privat-docent in Halle, had great experience in teaching the subject, so that his work when completed is sure to prove of real service.

Obituary.

Admiral John Lort Stokes, whose death occurred on the 11th of June at his residence, Scotchwell, was the second son of Henry Stokes of Scotchwell, Pembrokeshire. He entered the navy in the year 1824, on board the *Prince Regent*, bearing the flag of Sir Robert Moorsom, but was almost immediately transferred to H.M. sloop *Beagle*, in which vessel—probably a solitary occurrence in the navy—he served through all the grades of his profession, from that of midshipman to commander.

During these twenty years the *Beagle* was either engaged in exploring and surveying the wild and inhospitable shores of Patagonia and Tierra del Fuego, or in the then little known regions of Torres Strait and Western Australia; in the former service he was associated with FitzRoy, who commanded the survey, and was the friend and companion of Darwin, who in that voyage laid the foundation of a career which subsequently gained for him world-wide renown. When a lieutenant, and while exploring the Victoria river on the north-west coast of Australia, he received a severe spear wound from the natives, the effect of which he suffered from during the remainder of his life. He paid off the *Beagle* as commander in 1843, and in 1846 was advanced to post rank. In 1847 he was appointed to the command of H.M.S. *Acheron*, and was employed in her for four years in surveying the coasts of the then young colony of New Zealand.

Between the years 1860 and 1863, Captain Stokes was engaged on the survey of the south coast of England, and obtained his active flag rank in 1864. As a captain he received the good service pension, and in 1878 was awarded the flag officer's Greenwich Hospital pension. He had published in 1846, by order of the Lords of the Admiralty, an account of the *Beagle's* discoveries in Australia while he held the command of the survey.

Admiral Stokes was a magistrate for Haverfordwest and Pembrokeshire. He
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was elected a Fellow of the Royal Geographical Society in 1845, and served on the Council in the years 1856-57. Two papers by him, one "A Survey on the Southern Part of the Middle Island of New Zealand," the other "On Steam Communication with the Southern Colonies" (Australia and the Cape of Good Hope), were read by him to the Society and published in the 'Journal,' vols. xxi. and xxvi.

PROCEEDINGS OF THE GEOGRAPHICAL SECTION OF THE BRITISH ASSOCIATION.

ABERDEEN MEETING, 1885.

The meeting of the British Association was held this year at Aberdeen, commencing on the 9th September. The Geographical Section was organised as follows:—

PRESIDENT.—General J. T. Walker, C.B., R.E., LL.D., F.R.S.

VICE-PRESIDENTS.—Professor James Donaldson, M.A., LL.D., F.R.S.E.; John Rae, M.D., LL.D., F.R.S.; Admiral Sir E. Ommanney, C.B., F.R.S.; Lieut.-Col. R. L. Playfair.

SECRETARIES.—J. S. Keltie; J. S. O'Halloran; E. G. Ravenstein (*Recorder*); Rev. G. A. Smith, M.A.

COMMITTEE.—A. Buchan, M.A., F.R.S.E.; Dr. W. G. Blackie; Hugh Cleghorn, M.D.; Robert Capper; Sir George Campbell; Sir James Douglas; Admiral Farquhar; Francis Galton, M.A., F.R.S.; James Matthews, Lord Provost of Aberdeen; Admiral Bedford Pim; Trelawny Saunders; David Stewart; Rev. Canon H. B. Tristram, F.R.S.; Coutts Trotter; H. A. Webster; William Westgarth; Captain W. J. T. Wharton, R.N.; A. Silva White; Cope Whitehouse, M.A.

The leading features of this year's meeting was the prominence given to Indian subjects. The President's address naturally dealt with the grand trigonometrical and other surveys carried on in India, and out of a total of 34 papers and reports read, as many as 11 referred to the geography of India and the regions immediately adjoining it. Mr. Keltie's report on Geographical Education attracted a very large audience, and led to a prolonged discussion. Nor has this year's meeting been barren of results in other respects. The Committee for furthering the exploration of New Guinea was re-appointed, and 150*l.* were granted towards the expenses of Mr. Forbes' expedition. The following resolutions were likewise accepted by the Committee of recommendation:—

1. That General Walker, Sir H. Lefroy, Sir William Thomson, Mr. Alex. Buchan, Mr. J. Y. Buchanan, Mr. John Murray, Dr. Rae, and Captain Dawson, with power to add to their number, be a committee, for the purpose of organising a systematic investigation of the depth of the permanently frozen soil in the Polar regions, its geographical limits and relation to the present Pole of greatest cold, that Mr. H. W. Bates be secretary, and that the sum of 5*l.* be placed at the disposal of the Committee.

2. That General Walker, Sir H. Lefroy, Sir William Thomson, Mr. Alex. Buchan, Mr. J. Y. Buchanan, Mr. John Murray, Mr. Francis Galton, and Mr. H. W. Bates,

with power to add to their number, be a committee for the purpose of taking into consideration the combination of the Ordnance and Admiralty Surveys, and the production of a batho-hypsographical map of the British Islands, and that Mr. E. G. Ravenstein be secretary.

3. That General Walker, Sir William Thomson, Sir H. Lefroy, General Strachey, Prof. A. S. Herschel, Prof. Chrystall, Prof. C. Niven, and Prof. A. Schuster, be a committee for the purpose of inviting designs for a good differential-gravity meter in supersession of the pendulum, whereby satisfactory results may be obtained, at each station of observations in a few hours, instead of the many days over which it is necessary to extend pendulum observations, and that Prof. J. H. Poynting be secretary.

4. That Sir John Hooker, Sir George Nares, and Admiral Sir Leopold M'Clintock, be a committee for the purpose of drawing attention to the desirability of further research in the Antarctic regions, nearly half a century having elapsed since the last exploration, and that Admiral Sir E. Ommanney be secretary.

One other feature in connection with this year's meeting deserves notice, namely, the Loan exhibition of Scotch maps and geographical publications, which had been arranged by Mr. Webster and Mr. Silva White, of the Scottish Geographical Society. This is an innovation deserving of imitation at other meetings of a similar character.

The PRESIDENT's opening address was delivered on Friday, the second day of the Sectional Meeting. After some introductory remarks on the scope of the science of geography, he proceeded as follows :—

Scientific geography embraces a wide range of subjects, wider than can be claimed for any other department of science. Thus, the President of this Section has a vast field from which to gather subjects for his opening address. I shall, however, restrict my address to the subject with which I am most familiar, and give you some account of the Survey of India, and more particularly of the labours of the trigonometrical or geodetic branch of that survey, in which the best years of my life have been passed.

I must begin by pointing out that the survey operations in India have been very varied in nature, and constitute a blending together of many diverse ingredients. Their origin was purely European, nothing in the shape of a general survey having been executed under the previous Asiatic Governments; lands had been measured in certain localities, but merely with a view to acquiring some idea of the relative areas of properties, in assessing on individuals the share of the revenue levied on a community; but other factors than area—such as richness or poverty of soil, and proximity or absence of water—influenced the assessment, and often in a greater degree, so that very exact measurements of area were not wanted for revenue purposes, and no other reason then suggested itself why lands should be accurately measured. The value of accurate maps of individual properties, with every boundary clearly and exactly laid down, was not thought of in India in those days, and indeed has only of late years began to be recognised by even the British Government. The idea of a general geographical survey never suggested itself to the Asiatic mind. Thus when Englishmen came to settle in India, one of their first acts was to make surveys of the tracts of country over which their influence was extending; and as that influence increased, so the survey became developed from a rude and rapid primary delineation of the broad facts of general geography, to an elaborately executed and artistic delineation of the topography of the country, and in some provinces to the mapping of every field and individual property. Thus there have been three orders or classes

of survey, and these may be respectively designated geographical, topographical, and cadastral; all three have frequently been carried on *pari passu*, but in different regions, demanding more or less elaborate survey according as they happened to be more or less under British influence. There is also the Great Trigonometrical or Geodetic Survey, by which the graphical surveys are controlled, collated, and co-ordinated, as I will presently explain.

Survey operations in India began along the coast-lines before the commencement of the seventeenth century, the sailors preceding the land surveyors by upwards of a century. The Directors of the East India Company, recognising the importance of correct geographical information for their mercantile enterprises, appointed Richard Hakluyt, Archdeacon of Westminster, their historiographer and custodian of the journals of East Indian Voyages, in the year 1601, within a few weeks of the establishment of the company by Royal Charter. Hakluyt gave lectures to the students at Oxford, and is said by Fuller to have been the first to exhibit the old and imperfect maps and the new and revised maps for comparison in the common schools, "to the singular pleasure and great contentment of his auditory." The first general map of India was published in 1752 by the celebrated French geographer D'Anville, and was a meritorious compilation from the existing charts of coast-lines and itineraries of travellers. But the Father of Indian Geography, as he has been called, was Major Rennell, who landed in India as a midshipman of the Royal Navy in 1760, distinguished himself in the blockade of Pondicherry, was employed for a time in making surveys of the coast between the Paumben Passage and Calcutta, was appointed Surveyor of the East India Company's dominions in Bengal in 1764, was one of the first officers to receive a commission in the Bengal Engineers on its formation, and in 1767 was raised to the position of Surveyor-General. Bengal was not in those days the tranquil country we have known it for so many years, but was infested by numerous bands of brigands who professed to be religious devotees, and with whom Rennell came into collision in the course of one of his surveying expeditions, and was desperately wounded; he had to be taken 300 miles in an open boat for medical assistance, the natives meanwhile applying onions to his wounds as a cataplasm. His labours in the survey of Bengal lasted over a period of nineteen years, and embraced an area of about 300,000 square miles, extending from the eastern boundaries of Lower Bengal to Agra, and from the Himalayas to the borders of Bandelkand and Chota Nagpur. Ill-health then compelled him to retire from the service on a small pension, and return to England; but not caring, as he said, to eat the bread of idleness, he immediately set himself to the utilisation of the large mass of geographical materials laid up and perishing in what was then called the India House; he published numerous charts and maps, and eventually brought out his great work on Indian Geography, the 'Memoir of a Map of Hindostan,' which went through several editions; this was followed by his Geographical System of Herodotus, and various other works of interest and importance. His labours in England extended over a period of thirty-five years, and their great merits have been universally acknowledged.

Rennell's system of field-work in Bengal was a survey of routes checked and combined by astronomical determinations of the latitude and the longitude, and a similar system was adopted in all other parts of India until the commencement of the present century. But in course of time the astronomical basis was found to be inadequate to the requirements of a general survey of all India, as the errors in the astronomical observations were liable materially to exceed those of the survey, if executed with fairly good instruments and moderate care. Now this was no new discovery, for already early in the eighteenth century the French Jesuits who were making a survey of China—with the hope of securing the protection of the Emperor,

which they considered necessary to favour the progress of Christianity—had deliberately abandoned the astronomical method and employed triangulation instead. Writing in the name of the missionaries who were associated with him in the survey, Père Regis enters fully into the relative advantages of the two methods, and gives the trigonometrical the preference, as best suited to enable the work to be executed in a manner worthy the trust reposed in them by a wise prince, who judged it of the greatest importance to his State. "Thus," he says, "we flatter ourselves we have followed the surest course, and even the only one practicable, in prosecuting the greatest geographical work that was ever performed according to the rules of art."

What was true in those days is true still ; points whose relative positions have been fixed by any triangulation of moderate accuracy present a more satisfactory and reliable basis for topographical survey than points fixed astronomically. Though the lunar theory has been greatly developed since those days by the labours of eminent mathematicians, and the accuracy of the lunar tables and star catalogues is much increased, absolute longitudes are still not susceptible of ready determination with great exactitude ; moreover, all astronomical observations, whether of latitude or longitude, are liable to other than intrinsic errors, which arise from deflection of the plumb-line under the influence of local attractions, and which of themselves materially exceed the errors that would be generated in any fairly executed triangulation of a not excessive length, say not exceeding 500 miles.

Thus at the close of the last century Major Lambton, of the 33rd Regiment, drew up a project for a general triangulation of Southern India. It was strongly supported by his commanding officer—Colonel Wellesley, afterwards the Duke of Wellington—and was readily sanctioned by the Madras Government ; for a large accession of territory in the centre of the peninsula had been recently acquired, as the result of the Mysore campaign, by which free communication had been opened between the east and west coasts, of Coromandel and Malabar ; and the proposed triangulation would not merely furnish a basis for new surveys, but connect together various isolated surveys which had already been completed or were then in progress. The Great Trigonometrical Survey of India owes its origin as such, and its simultaneous inception as a geodetic survey, to Major Lambton, who pointed out that the trigonometrical stations must needs have their latitudes and longitudes determined for future reference just as the discarded astronomical stations, not however by direct observation, but by processes of calculation requiring a knowledge of the earth's figure and dimensions. But at that time the elements of the earth's figure were not known with much exactitude, for all the best geodetic arcs had been measured in high latitudes, the single short and somewhat questionable arc of Peru being the only one situated in the vicinity of the equator. Thus additional arcs in low latitudes, as those of India, were greatly needed and might be furnished by Lambton. He took care to set this forth very distinctly in the programme which he drew up for the consideration of the Madras Government, remarking that there was thus something still left as a desideratum for the science of geodesy, which his operations might supply, and that he would rejoice indeed should it come within his province "to make observations tending to elucidate so sublime a subject."

Lambton commenced operations by measuring a base-line and a small meridional arc near Madras, and then, casting a set of triangles over the southern peninsula, he converted the triangles on the central meridian into a portion of what is now known as the Great Arc of India, measuring its angles with extreme care, and checking the triangulation by base-lines measured at distances of two to three

degrees apart in latitude. His principal instruments were a steel measuring chain, a great theodolite, and a zenith sector, each of which had a history of its own before coming into his hands. The chain and zenith sector were sent from England with Lord Macartney's Embassy, to the Emperor of China, as gifts for presentation to that potentate, who unfortunately did not appreciate their value and declined to accept them; they were then made over to Dr. Dinwiddie, the astronomer to the embassy, who took them to India for sale. The theodolite was constructed in England for Lambton, on the model of one in use on the Ordnance Survey; on its passage to India, it was captured by the French frigate, the *Piémontaise*, and landed at Mauritius, but eventually it was forwarded to its destination by the chivalrous French Governor, De Caen, with a complimentary letter to the Governor of Madras.

Lambton was assisted for a short time by Captain Kater, whose name is now best known in connection with pendulum experiments and the employment of the seconds' pendulum as a standard of length; but for many years afterwards he had no officer to assist him. At first he met with much opposition from advocates of the discarded astronomical method, who insisted on its being sufficiently accurate and more economical than the trigonometrical. But he was warmly supported by Maskelyne, the Astronomer-Royal in England; and he soon had an opportunity of demonstrating the astronomical method to be fallacious, for its determination of the breadth of the peninsula in the latitude of Madras was proved by the triangulation to be forty miles in error. Still, for several years he never received a word of sympathy, encouragement, or advice either from the Government or from the Royal Society. A foreign nation was the first to recognise the importance of his services to science, the French Institute electing him a corresponding member in 1817. After this, honours and applause quickly followed from his own countrymen. In 1818 the Governor-General of India—then the Marquis of Hastings—decided that the survey should be withdrawn from the supervision of a local government and placed under the Supreme Government, with a view to its extension over all India, remarking at the same time that he was “not unaware that with minds of a certain order he might lay himself open to the idle imputation of vainly seeking to partake the gale of public favour and applause which the labours of Colonel Lambton had recently attracted”; but as the survey had reached the northern limits of the Madras Presidency, its transfer to the Supreme Government, if it was to be further extended, had become a necessity. He directed the transfer to be made, and the survey to be called in future the Great Trigonometrical Survey of India. Noticing that the intense mental and bodily labour of conducting it was being performed by Lambton alone, that his rank and advancing age demanded some relief from such severe fatigue, and further, that it was not right that an undertaking of such importance should hang on the life of a single individual, the Governor-General appointed two officers to assist him—Captain Everest, as chief assistant in the geodetic operations; and Dr. Voysey, as surgeon and geologist. Five years afterwards Lambton died, at the age of 70. The happy possessor of an unusually robust and energetic constitution and a genial temperament, he seems to have scarcely known a day's illness, though he never spared himself nor shrink from subjecting himself to privations and exposure which even Everest thought reckless and unjustifiable. These he accepted as a matter of course, saying little about them, and devoting his life calmly and unostentatiously to the interests of science and the service of his country.

Everest's career in the survey commenced disastrously. He was deputed by Lambton to carry a triangulation from Hyderabad, in the Nizam's territory, eastwards to the coast, crossing the forest-clad and fever-haunted basia of the Godavary

river, a region which he described as "a dreadful wilderness, than which no part of the earth was more dreary, desolate, and fatal." Indignant at being taken there, his escort, a detachment of the Nizam's troops, mutinied, and soon afterwards he and his assistants, and almost all the men of his native establishment, were stricken down by a malignant fever; many died on the spot, and the survivors had to be carried into Hyderabad, whence litters and vehicles of all descriptions, and the whole of the public elephants, were despatched to their succour. To recover his health Everest was compelled to leave India for a while and proceed to the Cape of Good Hope, where he remained for three years. He availed himself of the opportunity to inspect Lacaille's meridional arc, which, when compared with the arcs north of the equator, indicated that the opposite hemispheres of the globe were seemingly of different ellipticities. He succeeded in tracing this anomaly to an error in the astronomical amplitude of the arc, which had been caused by deflection of the plumb-line at the ends of the arc, under the influence of the attraction of neighbouring mountains. Thus he became aware of the necessity of placing the astronomical stations of the Indian arcs at points where the plumb-line would not be liable to material deflection by the attraction of neighbouring mountain ranges. Shortly after his return to India Lambton died, and Everest succeeded him, and immediately concentrated his energies on the extension of the Great Arc northwards. He soon came to the conclusion that his instrumental equipment, though good for the time when it was procured, and amply sufficient for ordinary geographical purposes, was inadequate for the requirements of geodesy; and generally inferior to the equipments of the geodetic surveys then in progress in Europe. He therefore proceeded to Europe to study the procedure of the English and French surveys, and also to obtain a supply of new instruments of the latest and most improved forms. The Court of Directors of the Honourable East India Company accorded a most liberal assent to all his proposals, and gave him *carte blanche* to provide himself with whatever he considered desirable to satisfy all the requirements of science.

Everest returned to India with his new instrumental equipment in 1830, a year that marks the transition of the character of the operations from an order of accuracy which was sufficient as a basis for the graphical delineation of a comparatively small portion of the earth's surface, to the higher precision and refinement which modern geodesists have deemed essentially necessary for the determination of the figure and dimensions of the earth as a whole. He immediately introduced an important modification of the general design of the principal triangulation, which up to that time had been thrown as a network over the country on either side of the Great Arc, as in the English survey and many others; but he abandoned this method, and, adopting that of the French survey instead, he devised a system of meridional chains, to be carried at intervals of about 1° apart, and tied together by longitudinal chains at intervals of about 5° , the whole forming, from its resemblance to the homely culinary utensil with which we are all familiar, what has been called the gridiron system in contradistinction to the network. The entire triangulation was to rest on base-lines to be measured with the new Colby apparatus of compensation bars and microscopes which had been constructed to supersede the measuring chain the Emperor of China had rejected; the base-lines were to be placed at the intersections of the longitudinal chains of triangles with the central meridional or axial chain, and also at the further angles of the gridirons on each side. Latitudes were to be measured at certain of the stations of the central chain, with new astronomical circles in place of the old zenith sector; to give the required meridional arcs of amplitude. Two radical improvements on all previous procedure were introduced in the measurement of the principal angles, one affecting the observations, the other

the objects observed. The great theodolites were manipulated in such a manner as not merely to reduce the effects of accidental errors by numerous repetitions in the usual way, but absolutely to eliminate all periodic errors of graduation by systematic changes of the position of the azimuthal circle relatively to the telescope, in the course of the complete series of measures of every angle. The objects formerly observed had been cairns of stones or other opaque signals; for these Everest substituted luminous signals, lamps by night, and, by day, heliotropes which were manipulated to reflect the sun's rays through diaphragms of small aperture, in pencils appearing like bright stars and capable of penetrating a dense atmosphere through which distant opaque objects could not be seen.

Everest's programme of procedure furnished the guiding principles on which the operations were carried out during the period of half a century which intervened between their commencement under his superintendence and the completion of the principal triangulation under myself. The external chains have necessarily been taken along the winding course of the frontier and coast-lines instead of the direct and more symmetrical lines of the meridians and the parallels of latitude. The number of the internal meridional chains has latterly been diminished by widening the spaces between them, and in two instances a principal chain has been dispensed with because, before it could be taken in hand, a good secondary triangulation had been carried over the area for which it was intended to provide. But these are departures from the letter rather than the spirit of Everest's programme, which has been faithfully followed throughout, first by his immediate successor, Sir Andrew Waugh, and afterwards by myself, thus affording an instance of the impress of a single mind on the work of half a century which is probably unique in the annals of India; for there, as is well known, changes of personal administration are frequent, and are not uncommonly followed by changes of procedure.

The physical features of a country necessarily exercise a considerable influence on the operations of any survey that may be carried over it, and more particularly on those of a geodetic survey, of which no portion is allowed to fall below a certain standard of precision. Every variety of feature, of scenery, and of climate that is to be met with anywhere on the earth's surface between the equator and the Arctic regions has its analogue between the highlands of Central Asia and the ocean, which define the limits of the area covered by the Indian survey. Thus in some parts the operations were accomplished with ease, celerity, and enjoyment, while in others they were very difficult and slow of progress, always entailing great exposure, and at times very deadly. In an open country, dotted with hills and commanding eminences, they advanced as on velvet; in close country, forest-clad or covered with other obstacles to distant vision, they were greatly retarded, for there it became necessary either to raise the stations to a sufficient height to overlook all surrounding obstacles, or to render them mutually visible by clearing the lines between them; and both these processes are more or less tedious and costly. There are many tracts of forest and jungle which greatly impeded the operations, not merely because of the physical difficulties they presented, but because they teemed with malaria, and were very deadly during the greater portion of the year, and more particularly immediately after the rainy seasons, when the atmosphere is usually clearest and most favourable for distant observations. At first tracts of forest, covering extensive plains, were considered impracticable; thus Lambton carried his network over the open country, and stopped it whenever it reached a great plain covered with forest and devoid of hills; but Everest's system would not permit of any break of continuity, nor the abandonment of any chain which was required to complete a gridiron; it has been carried out in all its integrity, often with much sacrifice of life, but never with any shrinking on the part of the

survey officers from carrying out what it had become a point of honour with them to accomplish, and the accomplishment of which the Government had come to regard as a matter of course. We have already seen how the progress of Everest's first chain of triangles was suddenly arrested, because he and all his people were struck down by malaria in the pestilential regions of the Godavery basin. That chain remained untouched for fifty years; it was then resumed and completed, but with the loss of the executive officer, Mr. George Shelverton, who succumbed when he had not yet reached, but was within sight of, the east coast-line, the goal towards which his labours were directed. Many regions, as the basin of the Mahanaddi, the valley of Assam, the hill ranges of Tipperah, Chittagong, Arracan, and Burma, and those to the east of Moulmein and Tennasserim, which form the boundary between the British and the Siamese territories, are covered with dense forest, up to the summits of the peaks which had to be adopted as the sites of the survey stations. As a rule the peaks were far from the nearest habitation, and they could not be reached until pathways to them had been cut through forests tangled with a dense undergrowth of tropical jungle; not unfrequently large areas had to be cleared on the summits to open out the view of the surrounding country. Here the physical difficulties to be overcome were very considerable, and they were increased by the necessity that arose, in almost every instance, of importing labourers from a great distance to perform the necessary clearances. But the broad belt of forest tract known as the Terai, which is situated in the plains at the feet of the Nepalese Himalayas, was the most formidable region of all, because the climate was very deadly for a great portion of the year, and more particularly during the season when the atmosphere was most favourable for the observations, though the physical difficulties were not so great as in the hill tracts just mentioned, and labour was more easily procurable. Lying on the British frontier, at the northern extremities of no less than ten of the meridional chains of triangles, it had necessarily to be operated in to some extent, and Everest wished to carry the several chains across it, on to the outer Himalayan range, and then to connect them together by a longitudinal chain running along the range from east to west, completing the gridiron in this quarter. But the range was a portion of the Nepalese territories, and all Europeans—excepting those attached to the British embassy at Khatmandu—were debarred from entering any part of Nepal, by treaty with the British Government. Everest hoped that the rulers of Nepal might make an exception in his favour for the prosecution of a scientific survey; and when he found they would not, he urged the Government to compel them to give his surveyors access, at least, to their outlying hills; but he urged in vain, for the Government would not run the risk of embarking in a war with Nepal for purely scientific interests. Thus the connecting chain of triangles—now known as the N.E. Longitudinal Series—had to be carried through the whole length of the Terai, a distance of about 500 miles, which involved the construction of over 100 towers—raised to a height of about 30 feet to overlook the earth's curvature—and the clearance of about 2000 miles of line through forest and jungle to render the towers mutually visible. It required no small courage on Everest's part to plunge his surveyors into this region; he endeavoured to minimise the risks as much as possible by taking up the longitudinal chain in sections, bit by bit, on the completion of the successive meridional chains, and thus apportioning it between several survey parties, each operating in the Terai for a short time, instead of assigning it to a single party to execute continuously from end to end, as all the other chains of triangles. But notwithstanding these precautions, the peril was great, and the mortality among both officers and men was very considerable; greater than in many a famous battle, says Mr. Clements Markham, in an eloquent passage in his *Memoir of the Indian Surveys*,

in which he claims for the surveyors who were employed on these operations—with no hope of reward other than the favourable notice of their immediate chief and colleagues—merit for more perilous and honourable achievement than much of the military service, which is plentifully rewarded by the praises of men and prizes of all kinds.

Everest retired in 1843, and was succeeded by Waugh, who applied himself energetically to the completion of the several chains of triangles exterior to the Great Arc, for which he obtained a substantial addition to the existing equipment of great theodolites. It was under him that the formidable longitudinal series through the Terai, which had been begun by Everest, was chiefly carried out. He personally initiated the determination of the positions and heights of the principal snow peaks of the Himalayan ranges; and he did much for the advancement of the general topography of India, which had somewhat languished under his predecessor, who had devoted himself chiefly to the geodetic operations. He retired in 1861, and I succeeded to the charge of the Great Trigonometrical Survey. The last chain of the principal triangulation was completed in 1882, shortly before my own retirement.

Of the general character of the operations, it may be asserted without hesitation that a degree of accuracy and precision has been attained which has been reached by few and surpassed by none of the great national surveys carried out in other parts of the world, and which leaves nothing to be desired even for the requirements of geodesy; a very considerable majority of the principal angles have been measured with the great 24-inch and 36-inch theodolite, and their theoretical probable error averages about a quarter of a second; of the linear measurements the probable error, so far as calculable, may be taken as not exceeding the two-millionth part of any measured length. And as regards the extent of the triangulation, if we ignore the primary network in Southern India, and all secondary triangulation, however valuable for geographical purposes, we still have a number of principal chains—meridional, longitudinal, and oblique—of which the aggregate length is 17,300 miles, which contain 9230 first-class angles all observed, and rest on eleven base-lines measured with the Colby apparatus of compensation bars and microscopes. This prodigious amount of field-work furnishes an enormous mass of interdependent angular and linear measures; and each of these is fallible in some degree, for, great as was the accuracy and care with which they had severally been executed, perfect accuracy of measurement is as yet beyond human achievement; thus every circuit of triangles, every chain closing on a base-line, and even every single triangle, presented discrepancies the magnitude of which was greater or less according as derived from a combination of many, or only of a few, of the fallible facts of observation. Thus, when the field operations were approaching their termination, the question arose as to how these facts were to be harmonised and rendered consistent throughout, which was a very serious matter considering their great number. The strict application of mathematical theory to a problem of this nature requires the adjustment to be effected by the application of a correction to every fact of observation, not arbitrarily, but in such a manner as to give it its proper weight, neither more nor less, in the final investigation, and in this the whole of the facts must be treated simultaneously. That would have involved the simultaneous solution of upwards of 4000 equations between 9230 unknown quantities, by what is called the method of minimum squares, and I need scarcely say that it is practically impossible to solve such a number of equations between so many unknown quantities by any method at all. Thus a compromise had to be made between the theoretically desirable and the practically possible. It would be out of place here to attempt to describe the method of treatment which was eventually adopted, after much thought and deliberation; I will merely say that the bulk of the triangulation

was divided into five sections, each of which was treated in succession with as close approximation to the mathematically rigorous method as was practically possible; but even then the mass of simultaneous interdependent calculation to be performed in each instance was enormous, I believe greatly exceeding anything of the kind as yet attempted in any other survey. But the happy result of all this labour was that the final corrections of the angles were for the most part very minute, less than the theoretical probable errors of the angles, and thus fairly applicable without taking any liberties with the facts of observation. If the attribute of beauty may ever be bestowed on such things as small numerical quantities, it may surely be accorded to these notable results of very laborious calculations, which, while in themselves so small, were so admirably effective in introducing harmony and precision throughout the entire triangulation.

If now we turn once more to what Lambton calls "the sublime science of geodesy," which was held in such high regard by both him and Everest, we shall find that the great meridional arc between Cape Comorin and the Himalayas, on which they laboured with so much energy and devotion, is not the only contribution to that science to which the Indian triangulation is subservient, but every chain of triangles—meridional, longitudinal, or oblique—may be made to throw light either on geodesy, the science of the figure of the earth, or on geognosy, the science of the earth's interior structure, when combined with corresponding astronomical arcs of amplitude. Thus each of the several meridional chains of triangles may be utilised in this way, as their prototype has been, by having latitude observations taken at certain of their stations to give meridional arcs; and the several longitudinal chains of triangles may also be utilised—in combination with the main lines of telegraph—by electro-telegraphic determinations of differential longitudes to give arcs of parallel. When the stations of the triangulation which are resorted to for the astronomical observations are situated in localities where the normal to the surface coincides fairly with the corresponding normal to the earth's figure, the result is valuable as a contribution to geodesy; when the normal to the surface is sensibly deflected by local attraction, the result gives a measure of the deflection which is valuable as a contribution to geognosy.

Having regard to these circumstances, I moved the Government to supply the Trigonometrical Survey with the necessary instruments for the measurement of the supplemental astronomical arcs; and as officers became available on the gradual completion of the successive chains of triangles, I employed some of them in the required determinations of latitude and differential longitude. It so happened that about the same time geodesists in Europe began to recognise the advantages to science to be acquired by connecting the triangulations of the different nationalities together, and supplementing them with arcs of amplitude. The "International Geodetic Association for the Measurement of Degrees in Europe" was formed in consequence, and it has been, and is still, actively employed in carrying out this object; in India, however, the triangulation was complete and connected throughout, so that only the astronomical amplitudes were wanting. They are still in progress, but already meridional chains, aggregating 1840 miles in length, and lying to the west of the Great Arc, have been converted into meridional arcs; and the three longitudinal chains, from Madras to Mangalore, from Bombay to Vizagapatam, and from Kurrachee via Calcutta to Chittagong, of which the aggregate length is 2600 miles, have been converted into arcs of parallel. In the former the operations follow the meridional course of the chains of triangles; in the latter they follow the principal lines of the electric telegraph, which sometimes diverge greatly from the direction of the longitudinal chains of triangles, the two only intersecting at occasional points; the astronomical stations are therefore placed at

the trigonometrical points which may happen to be nearest the telegraph lines, whether on the meridional or on the longitudinal chains, and their positions are invariably so selected as to form self-verificatory circuits which are usually of a triangular form, presenting three differential arcs of longitude; each of these arcs is measured independently as regards the astronomical work—though for the third arc there is usually no independent telegraph line, but only a coupling of the lines for the first and second arcs—and this has been proved to give such an excellent check on the accuracy of the operations, that it is not too much to say that no telegraphic longitude operations are entirely reliable which have not been verified in some such manner.

Through the courtesy of Colonel Stotherd, Director-General of the Ordnance Survey, I am enabled to exhibit two charts, one of the triangulation of India, the other of that of Europe, which have recently been enlarged to the same scale in the Ordnance Survey Office at Southampton for purposes of comparison. The first is taken from the official chart of the Indian survey, and shows the great meridional and longitudinal chains and Lambton's network of principal triangles, the positions of the base-lines measured with the Colby apparatus, the latitude and the differential longitude stations, the triangular circuits of the longitudinal arcs, the stations of the pendulum and the tidal operations which will be noticed presently, and the secondary triangulations to fix the peaks of the Himalayan and Sulimani ranges, and the positions of Bangkok in Siam and Kandahar in Afghanistan, the extreme eastern and western points yet reached. The chart of the European triangulation has been enlarged from one published by the International Geodetic Association of Europe; in it special prominence is given to the Russian meridional arc, which extends from the Danube to the Arctic Ocean, and is $25^{\circ} 20'$ in length, and to the combined English and French meridional arc, $22^{\circ} 10'$ in length, which extends from the Balearic Island of Formentera in the Mediterranean, to Saxaford in the Shetland Islands. The aggregate length of the meridional arcs already completed in India is about equal to that of the English, French, and Russian arcs combined; but the longest in India is about $1\frac{1}{2}^{\circ}$ shorter than the Russian. As regards longitudinal arcs, I believe the two which were first measured in India, and were employed shortly afterwards by Colonel Clarke in his last investigation of the figure of the earth, are the only ones which have as yet been deemed sufficiently accurate to be made use of in such investigations, though arcs of much greater length have been measured in Europe. It would be interesting, if time permitted, to set forth the salient points of divergence between the systems of the Indian and the European surveys; I will only mention that in the southern part of the Russian arc, for a space of about 8° from the Duna to the Dneister, a vast plain, covered with immense and almost impenetrable forests, presented great obstacles to the prosecution of the work; the difficulty was overcome by the erection of a large number of lofty stations of observation, wooden scaffoldings which were 120 and even as much as 146 feet high, to overlook the forests. In Indian forests, as the Terai on the borders between British and Nepalese territories, the stations were rarely raised to a greater height than 30 feet, or just sufficient to overtop the curvature, and all trees and other obstacles were cleared away on the lines between them: this was found the most expeditious and economical process. The stations were very substantial, with a central masonry pillar, for the support of a great theodolite, which was isolated from the surrounding platform for the support of the observer. The lofty Russian scaffoldings only sufficed for small theodolites, and they were so liable to shake and vibration, that the theodolites had to be fitted with two telescopes to be pointed simultaneously by two observers at the pair of stations, the angle between which was being measured.



All the modern geodetic data of the Indian survey that were available up to the year 1880 were utilised by Colonel A. R. Clarke, c.b., of the Ordnance Survey, in the last of the very valuable investigations of the figure of the earth which he has undertaken from time to time. It will be obvious that new data tend to modify in some degree the conclusions derived from previous data, for the figure of so large a globe as our earth is not to be exactly determined from measurements carried over a few narrow belts of its superficies. Thus thirty years ago it was inferred that the equator was sensibly elliptic—and not circular, as had been generally assumed—with its major axis in longitude $15^{\circ} 34'$ east of Greenwich; but later investigations indicate a far smaller ellipticity, and place the major axis in west longitude $8^{\circ} 15'$. More significant evidence of the influence of new facts of observation in modifying previous conclusions is furnished by the French national standard of length, the mètre, which was fixed at the ten-millionth part of the length of the earth's meridional quadrant, as deduced from the best geodetic data available up to the end of the last century; but it is now found to be nearly one five-thousandth part less than the magnitude which it is supposed to represent, the difference being about a hundred times greater than what would now be considered an allowable error in an important national standard of measure.

The Indian survey has also made valuable contributions to geodesy and geognosy in an elaborate series of pendulum observations for determining variations of gravity, which throws light both on the grand variation from the poles to the equator that governs the ellipticity, and on the local and irregular variations depending on the constitution of the interior of the earth's crust. They were commenced in 1865 by Captain J. P. Basevi, on the recommendation of General Sabine and the Council of the Royal Society, with two pendulums, one of which the General had swung in his notable operations which extend from a little below the equator to within 10° of the Pole. Captain Basevi had nearly completed the operations in India, and had taken swings at a number of the stations of the Great Arc and at various other points near mountain ranges and coast-lines, when he died of exposure in 1871 at a station on the high table-lands of the Himalayas, while investigating the force of gravity under mountain ranges. Major Heaviside swung the pendulums at the remaining Indian stations, then at Aden and Ismailia on the way back to England, and finally at the base station, the Kew Observatory. Afterwards they and a third pendulum were swung at Kew and Greenwich by Lieutenant-Colonel Herschel, who took all three to America, swung them at Washington, and then handed them over to officers of the United States Coast Survey, by whom they have been swung at San Francisco, Auckland, Sydney, Singapore, and in Japan.

The pendulum operations in India have been successful in removing from the geodetic operations the reproach which had latterly been cast on them, that their value has become much diminished since the discovery that the attraction of the Himalayan mountains is so much greater than had previously been suspected, that it may have materially deflected the plumb-line at a large number of the astronomical stations of the Great Arc, and injuriously influenced the observations. Everest considered the effects of the Himalayan attraction to be immaterial at any distance exceeding sixty miles from the feet of the mountains; but in his days the full extent and elevation of the mountain masses was unknown, and their magnitude was greatly underestimated. Afterwards, when the magnitude became better known, Archdeacon Pratt of Calcutta, a mathematician of great eminence, calculated that they would materially attract the plumb-line at points many hundred miles distant; he also found that everywhere between the Himalayas and the ocean, the excess of density of the land of the continent as compared with the water of the ocean would combine with the Himalayan attraction and increase the

deflection of the plumb-line northwards, towards the great mountain ranges, and that under the joint influence of the Himalayas and the ocean the level of the sea at Kurrachee would be raised 560 feet above the level at Cape Comorin.

But as a matter of fact the Indian arc gave a value of the earth's ellipticity which agreed sufficiently closely with the values derived from the arcs measured in all other quarters of the globe, to show that it could not have been largely distorted by deflections of the plumb-line; thus it appeared that whereas Everest might have slightly underestimated the Himalayan attraction, Pratt must have greatly overestimated it. His calculations were however based on reliable data, and were indubitably correct. For some time the contradiction remained unexplained, but eventually Sir George Airy put forward the hypothesis that the influence of the Himalayan masses must be counteracted by some compensatory disposition of the matter of the earth's crust immediately below them, and in which they are rooted; he suggested that the bases of the mountains had sunk to some depth into a fluid lava which he conceived to exist below the earth's crust, and that the sinking had caused a displacement of dense matter by lighter matter below, which would tend to compensate for the excess of matter above. Now Pratt's calculations had reference only to the visible mountain and oceanic masses, and their attractive influences—the former positive, the latter negative—in a horizontal direction; he had no data for investigating the density of the crust of the earth below either the mountains on the one hand, or the bed of the ocean on the other. The pendulum observations furnished the first direct measures of the vertical force of gravity in different localities which were obtained, and these measures revealed two broad facts regarding the disposition of the invisible matter below; first, that the force of gravity diminishes as the mountains are approached, and is very much less on the summit of the highly elevated Himalayan table-lands than can be accounted for otherwise than by a deficiency of matter below; secondly, that it increases as the ocean is approached, and is greater on islands than can be accounted for otherwise than by an excess of matter below. Assuming gravity to be normal on the coast-lines, the mean observed increase at the island stations was such as to cause a seconds' pendulum to gain three seconds daily, and the mean observed decrease in the interior of the continent would have caused the pendulum to lose $2\frac{1}{4}$ seconds daily at stations averaging 1200 feet above the sea-level, 5 seconds at 3800 feet, and about 22 seconds at 15,400 feet—the highest elevation reached—in excess of the normal loss of rate due to height above the sea.

Pratt was strongly opposed to the hypothesis of a substratum, or magma, of fluid igneous rock beneath the mountains; he assumed the earth to be solid throughout, and regarded the mountains as an expansion of the invisible matter below, which thus becomes attenuated and lighter than it is under regions of less elevation, and more particularly in the depressions and contractions below the bed of the ocean. And certainly we seem to have more reason to conclude that the mountains emanate from the subjacent matter of the earth's crust than that they are as wholly independent of it as if they were formed of stuff shot from passing meteors and asteroids; any severance of continuity and association between the visible above and the invisible below appears, on the face of it, to be decidedly improbable.

The hypothesis of sub-continental attenuation and sub-oceanic condensation of matter is supported by the two arcs of longitude on the parallels of Madras and Bombay; for at the extreme points of these arcs, which are situated on the opposite coast-lines, the horizontal attraction has been found to be not landwards, as might have been anticipated, but seawards, showing that the deficient density of the sea as compared with the land is more than compensated by the greater density of the matter under the ocean than of that under the land.

While on the subject of the constitution of the earth's crust, I may draw attention to the circumstance that the tidal observations which have been carried on at a number of points on the coasts of India, as a part of the operations of the Survey, tend to show that the earth is solid to its core, and that the geological hypothesis of a fluid interior is untenable. They have been analysed by Prof. G. H. Darwin, with a view to the determination of a numerical estimate of the rigidity of the earth, and he has ascertained that whilst there is some evidence of a tidal yielding of the earth's mass, that yielding is certainly small, and the effective rigidity is very considerable, not so great as that of steel as was at first surmised, but sufficient to afford an important confirmation of the justice of Sir William Thomson's conclusion as to the great rigidity.

The Indian pendulum observations have been employed by Colonel Clarke, in combination with those taken in other parts of the globe, to determine the earth's ellipticity. Formerly there was wont to be a material difference between the ellipticities which were respectively derived from pendulum observations and direct geodetic measurements, the former being somewhat greater than $\frac{1}{230}$, the latter somewhat less than $\frac{1}{230}$; but as new and more exact data became available, the values derived from these two essentially independent sources became more and more accordant, and they now nearly agree in the value $\frac{1}{231}$.

As a part of the pendulum operations, a determination of the length of the seconds' pendulum was made at Kew by Major Heaviside, with the pendulum which had been employed for the same purpose by Kater early in the present century, when leading men of science in England believed that in the event of the national standard yard being destroyed or lost, the length might be reproduced at any time with the aid of a reversible pendulum. In consequence of this belief an Act of Parliament was passed in 1824 which defined the relations between the imperial yard and the seconds' pendulum, the length of the former being to that of the latter—swung in the latitude of London, in a vacuum and at the level of the sea—in the proportion of 36 inches to 39·1393 inches. Thus, while the French took for their unit of length the ten-millionth part of the earth's meridional quadrant, the English took the pendulum swinging seconds in the latitude of London. In case of loss the yard is obviously recoverable more readily and inexpensively by reference to the pendulum than the mètre by reference to the quadrant; it is also recoverable with greater accuracy; still the accuracy is not nearly what would now be deemed indispensable for the determination of a national standard of length, and it is now generally admitted that every pendulum has certain latent defects, the influence of which cannot be exactly ascertained; thus the instrument cannot be relied on as a suitable one for determinations of absolute length; but, on the other hand, so long as its condition remains unaltered, it is the most reliable instrument yet discovered for differential determinations of the variations of gravity. In truth, however, the pendulum is a very wearisome instrument to employ even for this purpose, for it has to be swung many days and with constant care and attention to give a single satisfactory determination; thus if such a thing can be invented and perfected as a good differential-gravity meter, light and portable, with which satisfactory results can be obtained in a few hours instead of many days, the boon to science will be very great.

The trigonometrical operations fix with extreme accuracy two of the co-ordinates—the latitude and longitude—which define the positions of the principal stations; but the third co-ordinate, the height, is not susceptible of being determined by such operations with anything like the same degree of accuracy, because of the variations of refraction to which rays of light passing through the lower strata of the atmosphere are liable, as the temperature of the surface of the ground changes in

the course of the day. In the plains the apparent height of a station 10 to 12 miles from the observer has been found to be upwards of 100 feet greater in the cool of the night than in the heat of the day, the refraction being always positive when the lower atmospheric strata are chilled and laden with dew, and negative when they are rarefied by the heat radiated from the surface of the ground. At hill stations the rays of light usually pass high above the surface of the ground, and the diurnal variations of refraction are comparatively immaterial, and very good results are obtained by the expedient of taking the vertical observations between reciprocating stations at the same hour of the day, and as nearly as possible at the time of minimum refraction; but in the plains this expedient does not usually suffice to give reliable results. The hill ranges of central and those of northern India are separated by a broad belt of plains, which embraces the greater portion of Sind, the Punjab, Rajputana, and the valley of the Ganges, and is crossed by a very large number of the principal chains of triangles, on the lines where the chart shows stretches of comparatively small triangles, which are in most instances of considerable length. Thus it became necessary to run lines of spirit levels over these plains, from sea to sea, to check the trigonometrical heights. The opportunity was taken advantage of to connect all the levels which had been executed for irrigation and other public works, and reduce them to a common datum; and eventually lines of level were carried along the coast and from sea to sea to connect the tidal stations. The aggregate length of the standard lines of level executed up to the present time is nearly 10,000 miles, and an extensive series of charts of the levels derived from other departments of the public service and reduced to the survey datum has already been published.

The survey datum which has been adopted for all heights, whether deduced trigonometrically or by spirit-levelling, is the mean sea-level as determined, either for initiation or verification, by tidal observations at several points on the coast-lines. At first the observations were restricted to what was necessary for the requirements of the survey, and their duration was limited to a lunar month at each station. In 1872 more exact determinations were called for, to ascertain whether gradual changes in the relative level of land and sea were taking place at the head of the Gulf of Cutch, as had been surmised by the geological surveyors, and observations were taken for over a year at three tidal stations on the coasts of the gulf, to be repeated hereafter when a sufficient period had elapsed to permit of a measurable change of level having taken place. Finally, in 1875, the Government intimated that as "the great scientific advantages of a systematic record of tidal observations on Indian coasts had been frequently urged and admitted," such observations should be taken at all the principal ports and at such points on the coast lines as were best suited for investigations of the laws of the tides. In accordance with these instructions, five years' observations have been made at several points, and new stations are taken up as the operations at the first ones are completed.

The initiation of the later and more elaborate operations is due in great measure to the recommendations of the Tidal Committee of the British Association, of which Sir William Thomson was President. The tidal observations have been treated by the method of harmonic analysis advocated by the Committee. The constants for amplitude and epoch are determined for every tidal component, both of long and of short periods, and with their aid tide-tables are now prepared and published annually for each of the principal ports; and further, it is with them that Professor G. H. Darwin made the investigations of the effective rigidity of the earth, which I have already mentioned. The very remarkable waves which were caused by the earthquake on December 31st, 1881, in the Bay of Bengal, and by the notable volcanic eruptions in the island of Krakatoa and the Straits of Sunda on August 27th

and 28th, 1883, were registered at several of the tidal stations, and thus valuable evidence has been furnished of the velocities of both the earth-wave and the ocean-wave which are generated by such disturbances of the ordinarily quiescent condition of the earth's crust.

I must not close this account of the non-graphical, or more purely scientific operations of the Great Trigonometrical Survey of India without saying something of the officers who were employed thereon, under the successive superintendence of Everest, Waugh, and myself. A considerable majority were military, from all branches of the army—the cavalry and infantry, as well as the corps of engineers and artillery; the remainder were civilians, mostly promoted from the subordinate grades. Prominent shares in the operations were taken by Lieutenant Renny, Bengal Engineers, afterwards well known in this neighbourhood as Colonel Renny Tailyour, of Borrowfield in Forfarshire, of whom and his contemporary, Lieutenant Waugh, Everest, retiring, reported in terms of the highest commendation; by Reginald Walker, of the Bengal Engineers, George Logan, George Shelverton, and Henry Beverley, all of whom fell victims to jungle fever; by Strange, F.R.S., of the Madras Cavalry, whose name is associated with the construction of the modern geodetic instruments of the Survey; by Jacob—afterwards Government Astronomer at Madras—Rivers, and Haig, all of the Bombay Engineers; Tennant, C.I.E., F.R.S., Bengal Engineers, afterwards Master of the Mint in Calcutta; Montgomerie, F.R.S., of the Bengal Engineers, whose name is best remembered in connection with the Trans-Himalayan geographical operations; James Basevi, of the Bengal Engineers, who so sadly died of exposure while engaged on the pendulum operations in the higher Himalayas; Branfill, of the Bengal Cavalry; Thuillier, Carter, Campbell, Trotter, Heaviside, Rogers, Hill, and Baird, F.R.S., all engineer officers; also Hennessey, C.I.E., F.R.S., M.A., Herschel, F.R.S., and Cole, M.A., whose names are intimately associated with the collateral mathematical investigations and the final reduction of the principal triangulation.

The Trigonometrical Survey owes very much to the liberal and even generous support which it has invariably received from the Supreme Government, with the sanction and approval, first of the Directors of the East India Company, and afterwards of the Secretary of State for India. In times of war and financial embarrassment the scope of the operations has been curtailed, the establishments have been reduced, and some of the military officers sent to join the armies in the field; but whatever the crisis, the operations have never been wholly suspended. Even during the troubles of 1857–58, following the mutiny of the native army, they were carried on in some parts of the country though arrested in others: and the then Viceroy, Lord Canning, on receiving the reports of the progress of the operations during that eventful period, immediately acknowledged them to the Surveyor-General, Colonel Waugh, in a letter from which the following extract is taken:—

“I cannot resist telling you at once with how much satisfaction I have seen these papers. It is a pleasure to turn from the troubles and anxieties with which India is still beset, and to find that a gigantic work, of permanent peaceful usefulness, and one which will assuredly take the highest rank as a work of scientific labour and skill, has been steadily and rapidly progressing through all the turmoil of the last two years.”

The operations have been uninfluenced by changes of *personnel* in the administration of the Indian Empire, as Governor-Generals and Viceroys succeeded each other, but have met with uniform and consistent support and encouragement. It may well be doubted whether any similar undertaking, in any other part of the world, has been equally favoured and as munificently maintained.

In conclusion I must state that I have purposely said nothing of the graphical

operations executed in the Trigonometrical and other branches of the Survey of India, because they are more generally known, their results appear in maps which speak for themselves, and time would not permit of my attempting to describe them also. They comprise, *first*, the general topography of all India, mostly on the standard scale of 1 inch to the mile; *secondly*, geographical surveys and explorations of regions beyond the British frontier, notably such as are being carried on at the present time on the Russo-Afghan frontier, by Major Holdich and other officers of the Survey; *thirdly*, the so-called Revenue Survey of the British districts in the Bengal Presidency, which is simply a topographical survey on an enlarged scale—4 inches to the mile—showing the boundaries and areas of villages for fiscal requirements; and *fourthly*, the Cadastral Survey of certain of the British districts in the Bengal Presidency, showing fields and the boundaries of all properties, on scales of 16 to 32 inches to the mile. There are also certain large scale surveys of portions of British districts in the Madras and Bombay Presidencies, which, though undertaken originally for purely fiscal purposes by revenue and settlement officers working independently of the professional survey, have latterly been required to contribute their quota to the general topography of the country. And of late years a survey branch has been added to the Forest Department, to provide it with working maps constructed for its own requirements on a larger scale than the standard topographical scale, but on a trigonometrical basis, and in co-operation with the Survey Department. But this brief capitulation gives no sort of idea of the vast amount of valuable topographical and other work for the requirements of the local Administrations and the public at large—always toilsome, often perilous—which has been accomplished, quite apart from and in quantity far exceeding the non-graphical and more purely scientific work which I have been describing. Its magnitude and variety are such that a mere list of the officers who have taken prominent shares in it, from first to last, would be too long to read to you. Three names, however, I must mention: *first*, that of General Sir Henry Thuillier, who became Surveyor-General on the same day that I succeeded to the superintendence of the Great Trigonometrical Survey, and with whom I had the honour of co-operating for many years; under his administration a much larger amount of topography was executed than under any of his predecessors, and a great impetus was given to the lithographic, photographic, engraving and other offices in which the maps of the Survey are published; *secondly*, that of Colonel Sconce, who became Deputy Surveyor-General soon after my accession in 1878 to the Surveyor-Generalship, and with whom I was associated for some years, much to my gratification and advantage, in various matters, but more particularly in the establishment of cadastral surveys on a professional basis at a moderate cost, to render them more generally feasible, which was a matter of the utmost importance for the administration of the more highly populated portions of the British provinces; and *thirdly*, that of Lieutenant-Colonel Waterhouse, who has for many years superintended the offices in which photography is employed, in combination with zincography and lithography, for the speedy reproduction *en masse* of the maps of the Survey, and has done much to develop the art of photogravure, whereby drawings in brushwork and mezzotint may be reproduced with a degree of excellence rivalling the best copperplate engraving, and almost as speedily and cheaply as drawings in pen-and-ink work are reproduced by photo-zincography.

Mr. Clements Markham's Memoir on the Indian Surveys gives the best account yet published of the several graphical surveys up to the year 1878. In that year the Trigonometrical, the Topographical, and the Revenue branches, which up to that time had constituted three separate and almost independent departments,

were amalgamated together into what is now officially designated "the Survey of India." In the same year the chronicle so well commenced by Mr. Markham came to an end on his retirement from the India Office—unfortunately, for it is a work of excellence in object and in execution, and most encouraging to Indian surveyors, who find their labours recorded in it with intelligent appreciation and kindly recognition.

During the present meeting, several papers by officers of the Survey will be read—one by Colonel Barron, in person, on the cadastral surveys in the organisation of which he has taken a leading share; by Major Baird, on the work of the spirit-levelling which he superintends conjointly with the tidal observations; by Colonel Godwin Austen, on Lieutenant-Colonel Woodthorpe's recent journey from Upper Assam to the Irawadi river; by Colonel Branfill, on the physical geography of Southern India; and by Colonel Tanner, on portions of the Himalayas and on recent explorations in Southern Tibet. Major Bailey will also read a paper on the forest surveys.

NEW GEOGRAPHICAL PUBLICATIONS.

(By J. SCOTT KELTIE, *Librarian R.G.S.*)

ASIA.

[*Asia*.]—Centenary Review of the Asiatic Society of Bengal. From 1784 to 1883.

Published by the Society. Calcutta, Thacker, Spink & Co., 1885: pp. 195, iv., 216, ciii., 109, xvi., 20.

This is an interesting record of a hundred years' valuable work. We have first the history of the Society, the parent of all Asiatic Societies, by Dr. Rajendralala Mitra. The object of the Society was, in the terms of the original resolution, "enquiring into the history and antiquities, arts, sciences, and literature of Asia." How well the Society has carried out its purpose is evident from the present record of its century's work. It was only in 1851 that the Society formally recognised the title of "The Asiatic Society of Bengal," to distinguish it from the subsequently founded Asiatic Society, which has its seat in London.

The Appendices to Part I. are—A. A statement showing the number of members on the rolls of the Society from time to time (89 in 1788, 323 in 1883); B. List of Presidents, Vice-Presidents, and Secretaries of the Society; C. List of books published, directly or indirectly, by the Society; D. Index to the papers and contributions to the Asiatick Researches, and the Journal and Proceedings of the Society.

The second part of this volume is devoted to a record of the work which has been done in archaeology, history, literature, &c., and is from the pen of Dr. A. F. Rudolf Hoernle. This part is divided into five chapters:—I. Antiquities. II. Coins. III. Ancient Indian Alphabets. IV. History. V. Language and Literature. There are two appendices to the chapter on history, and a classified index to the scientific papers in the Society's publications:—I. Antiquities. II. Coins, Gems, Weights and Measures. III. History. IV. Language and Literature. V. Religion, Manners, Customs, &c.

Part. III. deals with Natural Science, by Mr. P. N. Bose. Chapter I. is devoted to Mathematical and Physical Science. Chapter II. Geology. Chapter III. Zoology. Chapter IV. Botany. Chapter V. Geography (1. The Himalayas. 2. Assam and the North-eastern Frontier. 3. Burma, Islands in the Bay of Bengal, China, &c. 4. Southern India. 5. Western India and the North-western Frontier. 6. Afghanistan and Central Asia). Chapter VI. Ethnology. Chapter VII. Chemistry. Chapter VIII. The Museum. Appended is a classified index to the various papers coming under each of these sections. Finally, we have a report of the proceedings of the Special Centenary Meeting of the Society in Calcutta, on January 15th, 1884.

Cochinchine Française.—Excursions et Reconnaissances. IX. No. 22. Mars-Avril 1885. Saigon, Imprimerie Coloniale, 1885.

We have in this number a brief letter from M. Aymonier containing a few preliminary notes on the country and people about the village of Maivan in the Bay of Phunrang. M. Aymonier is preparing a memoir of some length on the Chams of Binhthuan, a people hitherto almost unknown. The valuable Notes on the Laos, by M. Aymonier, is completed in this part, the present section dealing with the Mœuongs Kouis and the Khmêrs. There are besides notes on the history and botany of Tea, by M. G. Baux; a third instalment of Annamite stories and legends by M. A. Landes; and a first article on the Fishes of Lower Cochinchina and Cambodia, by Dr. Gilbert Tirant.

Hirth, F. [Ph. D.]—China and the Roman Orient: Researches into their Ancient and Mediæval relations as represented in old Chinese records: pp. xvi. and 330. Leipsic and Munich, G. Hirth; Shanghai and Hongkong, Kelly & Walsh, 1885.

Dr. Hirth, who has been long resident in Shanghai as Inspector-General of Customs, has devoted special attention to the old literature of China. His main object in the present volume is to endeavour to identify the allusions in the old records and histories of China to western nations, and especially to the Roman Empire. He has brought much learning and research to bear on the problems to be solved, and has to traverse the conclusions reached by Colonel Yule and other previous writers on the subject. After a preface of some length, Dr. Hirth refers to and discusses some of the dynastic histories in his introduction. He then gives a series of extracts from the Chinese texts with translations; followed by an elaborate attempt at identification, into which much ancient and modern geography is introduced. Appended is a map of "Asia Anterior ad mentem scriptorum Sinensium antiquorum."

AFRICA.

Hassenstein, Hugo.—Friedrich Bohndorff's Reisen in Zentral-Africa, 1874 bis 1883. 'Petermann's Mittheilungen,' ix. 1885, pp. 339-50.

This is a somewhat detailed sketch of Bohndorff's wanderings in the Central and Upper Nile region of Africa. Bohndorff was in the service of Gordon during his first residence in the Sudan, and afterwards set out to explore on his own account, and latterly in connection with Dr. Junker. Unfortunately much of his diary has been lost, and the geographical value of Bohndorff's work is therefore not so great as it might otherwise have been. Still the narrative which Herr Hassenstein is able to give will help to supplement the information collected by Schweinfurth, Felkin and Wilson, Buchta, and Lupton Bey. Some of this information Herr Hassenstein has embodied in the map (1 : 1,000,000) which accompanies his paper, and which embraces the upper waters of the Nile, the Welle-Makua and the Werre.

AMERICA.

Petroff, Ivan.—Report on the Population, Industries, and Resources of Alaska. Washington, Government Printing Office, 1884: pp. vi. and 180.

This is one of the valuable productions which have been issued from the Census Office of the United States, in connection with the Census of 1880. It is divided into five chapters: I. Statistical Review by geographical divisions; II. Resources; III. Geography and Topography; IV. Historical Sketch of Alaska; V. Alaskan Ethnology. These headings, however, give no adequate idea of the mine of information in this volume relating to all aspects of the country—topography, hydrography, geology, natural history, manners, customs, daily life, folk-lore of the people. It is, moreover, really interesting reading. There are eight maps: (1) physical map of Alaska and adjoining regions, 1 : 3,500,000; (2) the same, showing distribution of the various tribes; (3) small map, showing boundaries and divisions; (4) same, showing distribution of

beaver, and land and sea otters; with four other maps showing distribution of polar, brown, and black bears, foxes, musk, and marten; and of tundra, timber, and glaciers. There are also eight coloured illustrations of scenery, people, &c.

Powell, J. W.—Second Annual Report of the Bureau of Ethnology to the Secretary of the Smithsonian Institution, 1880–81. Washington, Government Printing Office, 1883: pp. xxxvii. and 477.

After a short Report by the Director of U.S. Bureau of Ethnology, Mr. Powell, we have the following papers in this handsome volume: *Zufi Fetiches*, by Frank Hamilton Cushing; *Myths of the Iroquois*, by Erminnie A. Smith; *Animal Carvings from the Mounds of the Mississippi*, by Henry W. Henshaw; *Navajo Silversmiths*, by Dr. Washington Matthews; *Art in Shell of the Ancient Americans*, by William H. Holmes; *Illustrated Catalogue of the Collections obtained from the Indians of New Mexico and Arizona in 1879–80*, by James Stevenson. These papers are accompanied by some hundreds of plates and illustrations, many of them coloured, and all of them carefully executed.

Toeppen, [Dr.] Hugo.—Hundert Tage in Paraguay. Reise in's Innere. Paraguay im Hinblick auf Deutsche Kolonisations-Bestrebungen. Map, 1:1,200,000, pp. 264. Hamburg, Friedrichsen & Co., 1885. Price 6s. (*Trübner.*)

This is a separate reprint of a paper which appeared in the 'Mitteilungen' of the Hamburg Geographical Society in 1884. It is a welcome addition to our knowledge of a country about which, and especially its present condition, we know comparatively little. The special object of Dr. Toeppen's visit was to investigate the suitability of the country for German colonisation, and about 100 pages of the book are devoted to his investigations in relation to this subject, and his statement of the case seems very fair. The map is based on that of Keith Johnston, with additions and modifications from the author's own observations, and the maps of Azara, Page, Du Gratz, and others.

GENERAL.

Schwarz, Dr. Bernhard.—Die Erschliessung der Gebirge von den ältesten Zeiten bis auf Saussure: nach Vorlesungen an der K. Bergakademie zu Freiberg-i.-S. für Geographen, Kulturhistoriker und Militärs dargestellt von Dr. Bernhard Schwarz. Froberg, Leipzig, 1885. (*Trübner.*)

Dr. Schwarz considers that the story of man's "vertical advance"—as he styles it—forms as much a part of the conquest of nature, and is as well worth telling, as that of his lateral progress. In this series of lectures he first sketches generally the relations between men and mountains, and then recounts more in detail particular incidents in them. The binding-link of his various material holds somewhat loosely, and he has some difficulty in keeping mountain travel distinct from mountaineering on the one hand and general travel on the other. His scope is too wide for each subject to be treated more than summarily, and there is room for correction in detail in the Alpine history. But he has compiled an original and interesting volume in which various erudition is shown in combination with sound common-sense.

Among the subjects of his chapters are the marches of the Ten Thousand and Alexander the Great. In Roman times he selects Hannibal's mountain campaigns, the subjugation of the Alps, the Romans in the more distant mountains in and outside Europe. Then follow a sketch of Byzantine and Saracenic mountain travel, ascents of Sinai, early visits to Lebanon, records of the Mongol rulers and of the various commercial travellers, culminating in Marco Polo, who penetrated the Highlands of Central Asia. A brief account is given of the Spaniards of the Andes, and the volume concludes with a hardly adequate and too compressed sketch of the fathers of Swiss scientific travel, Gesner and Scheuchzer.—[D. W. F.]

Schwarz, Theodor.—Ueber Fels und Firn: Bezwingung der mächtigsten Hochgipfel der Erde durch den Menschen nach Besichten aus früherer und späterer Zeit für

junge wie alte Freunde der Berge dargestellt von Theodor Schwarz. Leipzig, Paul Froberg, 1884. (*Trübner*.)

Dr. Schwarz in his preface tells his readers that he believes "that no more attractive introduction into the domain of physical geography—a branch of education daily recognised as of greater importance—can be found than such a collection (of mountain ascents) as is here offered." Accordingly he has extracted and where needful translated a number of authentic accounts of mountain exploration, beginning with Sinai and ending with Mount Cook. Each ascent is prefaced with a few words of introduction giving a sketch of the mountain's history, and this editorial work is well done. We subjoin a list of the mountains referred to and the authors quoted, with the dates of the ascents:—

Sinai: Bernard (von Breydenbach, 1483; Dr. G. Ebers, 1870. Elbrus, Kasbek: Freshfield, 1868. Ararat: Parrot, 1834. Argäus: H. F. Tozer, 1879. Demavend: Brugsch, 1861. Ibi-Gamin: Schlagintweit, 1855. Fusi-yama: Rein, 1874. Long's Peak: Miss Bird, 1879. Popocatepetl: von Thielmann, 1876. Orizaba: Doignon, 1851; von Müller, 1856. Irazu: Scherzer, 1853. Cotopaxi: Reiss, 1873. Teneriffe: Löher, 1875. Cameroons Mountain, Barth (after Burton), 1861. Kilimanjaro: Von der Decken, 1862; New, 1863. Hekla: Ida Pfeiffer, 1845. Guldhöpig: Passarge, 1880. Lomnitzerspitze: Von Fellenberg, 1860. Königstein (Transylvania), Filtch, 1876. Olympus: Heuzey, 1860; Barth, 1862. Parnassus: Vischer, 1853. Ætna: Spallanzani, 1788. Gran Sasso d'Italia: Calberla, 1875. Monte Rotondo: Gregorovius, 1852. Mulahacen: Willkomm, 1845. Maladetta: Vassier, 1870. Mont Blanc: De Saussure, 1787. Mount Cook: Green, 1882. An Ascent in Greenland, Payer, 1870.—[D. W. F.]

The following works have also been added to the Library:—

[**America, United States.**—Tenth Census of the United States. 1880. Nine volumes. Washington, Government Printing Office, 1883–84: 4to., maps and plates.

— Department of the Interior, United States Geological Survey, J. W. Powell, Director. Monographs of the United States Geological Survey. Vol. vii. Silver-Lead Deposits of Eureka Nevada. By Joseph Story Curtis. Washington, Government Printing Office, 1884: 4to., plates, pp. xii. and 200.

Appendix to the Memoir No. 5 of Tōkiō Daigaku (Tōkiō University). Measurement of the Force of Gravity and Magnetic Constants at Ogasawarajima (Bonin Island), reported by A. Tanakadate. Published by Tōkiō Daigaku, Tōkiō, 2545 (1885): sm. folio, pp. 31, plate.

[**Argentine Republic.**—Estadística del Comercio y de la Navegación de la República Argentina correspondiente al Año 1884. Publicación Oficial. Buenos Aires, Stiller & Laass, 1885: 8vo., pp. xxxv. and 340.

Astronomiska Iakttagelser och Undersökningar anställda på Stockholms Observatorium. Utgifna af Hugo Gylden. Andra Bandet. Häftet 1. Iakttagelser af Rektascensioner vid Meridiancirkeln på Stockholms Observatorium under Året 1875. Häftet 3. Constantes à employer dans le calcul des Perturbations absolues produites par Jupiter dans les Mouvements des Petites Planètes. Par A. Donner. Stockholm, P. A. Norstedt & Söner, 1881–3: 4to., pp. (1) 112, (3) 33.

Australian Museum.—Catalogue of the Australian Hydroid Zoophytes, by W. M. Bale. Sydney, T. Richards, Government Printer, 1884: pp. 198, 8vo., plates.

Baedeker, K.—Switzerland, and the adjacent portions of Italy, Savoy, and the Tyrol. Handbook for Travellers. Eleventh edition. Leipsic, Karl Baedeker, 1885: pp. xxviii. and 464, 12mo., maps, plans, and panoramas.

Casartelli, [Rev.] L. C.—Notes of a Course of Lectures on Commercial Geography. Manchester, J. B. Ledsham; London, Simpkin, Marshall & Co., 1884: post 8vo., pp. iv. and 117. Price 1s. 6d.

A set of brief notes for lectures upon commercial and industrial geography, gathered from various sources.

Den Norske Nordhavs-Expedition 1876-1878.—[The Norwegian North-Atlantic Expedition 1876-1878.] Zoologi. Crustacea, I. Ved G. O. Sara. Christiania, Grøndahl & Sønns, 1885. Imp. 4to., pp. 280, map and plates.

Dominican Republic.—Report of the Commission of Inquiry to Santo Domingo, with the Introductory Message of the President, Special Reports made to the Commission, State Papers furnished by the Dominican Government, and the statements of over seventy witnesses. Washington, Government Printing Office, 1871: pp. v. and 297, 8vo., map.

Hertha, Zeitschrift für Erd-, Völker- und Staatenkunde. Unter Mitwirkung des Freiherrn Alexander von Humboldt, besorgt von Heinrich Berghaus in Berlin und Karl Friedrich Völlrath Hoffmann in Stuttgart. Achter Band. Stuttgart und Tübingen, J. S. Cotta'schen Buchhandlung, 1826: 8vo., map and frontispiece, pp. 306 and 160.

Meteorologiska Iakttagelser i Sverige utgifna af Kongl. Svenska Vetenskaps-Akademien anställda och utarbetade under inseeende af Meteorologiska Central-Anstalten. 1878 and 1879. Stockholm, P. A. Norstedt & Söner, 1882-3: 4to., pp. (1878) vii. and 151, (1879) vii. and 153.

Peschel, Oscar.—Abhandlungen zur Erd- und Völkerkunde. Herausgegeben von J. Löwenberg. Leipzig, Duncker & Humblot, 1877-1879: 3 vols., pp. (vol. i.) x. and 530; (vol. ii.) 546; (vol. iii.) 455; 8vo.

——— **Europäische Staatenkunde.** Mit einem Anhang: Die Vereinigten Staaten von Amerika. Mit Benutzung der hinterlassenen Manuscripte Oscar Peschel's nach den Originalquellen bearbeitet von Otto Krümmel. Erster Band. Erste Abtheilung. Allgemeiner Theil.—Das Russische Reich.—Skandinavien.—Dänemark.—Das Britische Reich. Leipzig, Duncker & Humblot, 1880: 8vo., pp. xix. and 425.

Stow, J. P.—South Australia: its History, Productions, and Natural Resources. Adelaide, E. Spiller, 1883: pp. xii. and 195, 8vo., maps and illustrations.

St. John, [Sir] Spenser.—Hayti, or the Black Republic. London, Smith, Elder, & Co., 1884: pp. xiv. and 343, 8vo., map.

[The 'Jeannette' Expedition.]—Proceedings of a Court of Inquiry convened at the Navy Department, Washington, D.C., October 5, 1882, in Pursuance of a joint Resolution of Congress approved August 8, 1882, to investigate the circumstances of the Loss in the Arctic Seas of the Exploring Steamer 'Jeannette,' &c. Washington, Government Printing Office, 1883: pp. 363, 8vo., charts and plates.

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Deutschen Reiches, Karte des —. Herausgegeben von der kartogr. Abtheilung der Königl. Preuss. Landes-Aufnahme 1884. Scale 1:100,000 or 1·3 geographical miles to an inch. Sheets:—501 Beuthen; 521 Myslowitz; 536 Hultschin; 541 Birkenfeld; 542 Kusel; 600 Bourdonnaye. Price 1s. 6d. each sheet. (*Dulau.*)

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Italia.—Carta d' —. Scales 1:50,000 or 1·4 inches to a geographical mile, and 1:25,000 or 2·9 inches to a geographical mile. Istituto Topografico Militare, Firenze, 1884. Sheets: 29—I. II. III. IV. 30—I.; II. N.E., S.E., S.O., N.O.; III. S.E., N.E., S.O., N.O.; IV. 31—II. N.E., S.E., N.O., S.O.; III. N.E., S.E., N.O., S.O. 58—II. N.E., S.E., N.O., S.O.; III. N.E., S.E., N.O., S.O. 74—II. N.E., S.E., N.O., S.O. 86—I. S.O.; II. III. IV. 87—I. N.E., S.E., N.O., S.O.; II. N.E., S.E., N.O., S.O.; III. N.E., N.O., S.E., S.O.; IV. S.E., N.O., S.O. 98—I. II. III. IV. Price 7d. each sheet. (*Dulau.*)

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Oesterreichisch-Ungarischen Reiches.—Karte des — von Joseph Ritter von Scheda, Kaiserl. Königl. Oberst. Scale 1:1,010,000 or 13·8 geographical miles to an inch. Verlag u. Eigenthum v. Artaria & Comp. in Wien. Ausgabe 1885. 4 sheets. Price 12s. (*Dulau.*)

— General-Strassen und Ortskarte des —, nebst ganz Süd-West-Deutschland, einem grossen Theile von Nord-Italien, der Schweiz, der Türkei, und der übrigen angrenzenden Länder. Scale 1:1,300,000 or 17·8 geographical miles to an inch. Verlag und Eigenthum von Artaria & Co. in Wien, 1885. 4 sheets. Price 6s. Same map with hill shading, price 9s. (*Dulau.*)

Riesengebirge.—Special Karte vom —, von W. Liebenow. Scale 1:150,000 or 2 geographical miles to an inch. Breslau, Trewendt. Price 1s. 6d. (*Dulau.*)

Sussex.—An Archæological Map of —, shewing all the Manor Houses, Priors, Churches, Ruined Abbeys, Palaces and Castles, British or Roman Remains, and other objects of interest in this county, with the nearest railway station. Designed, drawn, and published by J. West, London, 1885. Price 6d.

Ungarn.—Orts und Strassenkarte des Königreiches — (mit Inbegriff des ehemaligen Siebenbürgen) nebst Kroatien und Slavonien. Bearbeitet von A. Steinhauser, k.k. Reg.-Rath. Scale 1:1,296,000 or 17·7 geographical miles to an inch. Artaria & Co., Wien. Price 4s. (*Dulau.*)

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Bk.; Boughton, 2; Bridgham, Ar. Bk.; Burgh St. Margaret, 1; Burgh St. Peter, 2; Catton, Ar. Bk.; Crimpleham, 1; Croxton, 1; East Lexham, 1; Feltwell, 2; Filby, 1; Fincham, 2; Freethorpe, (Det.), 2; Fornett St. Mary, Ar. Bk.; Gillingham, 1; Gorleston, 1; Great Dunham, 1; Halvergate, 2; Hellesdon, Ar. Bk.; Hemsby, 3; Hillsborough, Ar. Bk.; Hockwold cum Wilton, Ar. Bk.; Holme Hale, Ar. Bk.; Ickburgh, Ar. Bk.; Kempstone, 1 and Ar. Bk.; Langford, Ar. Bk.; Langley (Det.), 1; Litcham, 1; Little Creesingham, Ar. Bk.; Methwold, 6; Mileham, Ar. Bk.; Moulton (Det.), 2; Narborough, 1; Narford, 1; Needham, 1; Ormesby St. Margaret with Scratby, 2; Ormesby St. Michael, 2; Oxborough, 1; Pulham St. Mary the Virgin, 1; Reden with Harleston, 1; Reedham, 1; Rollesby, 1; Runham (Det.), 1; Rushall, 1; Santon, 2; Shottisham All Saints, 1; South Washam St. Lawrence, 1; Starston, 1; Stockton (Det.), 1; Stoke Ferry, 2; Stradsett, 1; Thetford St. Peter, 1; Toft Monks (Det.), 1; Topcroft, 1; Weeling with Bromehill, 1; Vereham, 3; West Dereham, 2; West Tofts, 1; Wheat-acre, 1; Winterton, 1; Woodton, 2; Wortwell, 2; Wretton, 1. **Northamptonshire**: Ashton, 1; Aytho, 1; Badby, 4; Banbury, 1; Blisworth, 1; Bozeat, 2; Braunton, 1; Brington, 3; Brockhall, 1; Bugbrooke, 1; Castle Ashby, 4; Catesby, 3; Chalcombe, 1; Charwelton, 1; Coghenoe, 1; Collingtree, 1; Cosgrove, 2; Courteenhall, 1; Croughton, 2; Culworth, 1; Daventry, 2; Denton, 1; Earls Barton, 1; Easton Maudt, 4; Edgcote, 1; Evenley, 2; Fawsley, 1; Floore, 6; Gayton, 1; Grafton Regis, 1; Great Doddington, 1; Great Houghton, 1; Grendon, 5; Hanslope, 1; Hardingstone, 1; Harleston, 1; Harpole, 3; Hartwell, 1; Hellidon, 3; Kilsillingbury, 2; Little Houghton, 1; Marston St. Lawrence, 1; Milton, 2; Middleton Cheney, 1; Nether Heyford, 2; Newnham, 2; Norton, 1; Pansham, 1; Piddington, 1; Preston Deanery, 1; Quinton, 1; Roade, 1; Rothorpe, 1; Staverton, 4; Stoke Bruerne, 1; Strexton, 2; Stuchbury, 1; Sulgrave, 1; Syresham, 1; Trenford, 1; Thorpe Mandeville, 2; Upper Heyford, 3; Whiston, 1; Whitfield, 1; Wicken, 2; Wollaston, 2; Wootton, 1; Yardley Gobion, 1; Yardley Hastings, 1. **Nottinghamshire**: Attenborough, 5; Avernham, 3; Balderton, 2; Beeston, 4; Bleasby, 1; Bldworth, 1; Budby, 1; Calverton, 2; Carburton, 1; Causton, 1; Clifton with Glapton, 3; Cuckney, 1; East Stoke, 1;

Edwalton, 1; Edwinstowe, 1; Epperstone, 1; Farndon, 1; Flakerton cum Morton, 1; Gedling, 1; Gonalston, 1; Gotham, 2; Granby, 1; Hawton, 2; Haywood Oaks, 1; Holme, 1; Kelham, 3; Kingston-upon-Soar, 4; Lambley, 1; Langar, 1; Langford, 1; Lenton, 3; Newark-upon-Trent, 2; Nether Langwith, 1; Normanton-upon-Soar, 2; North Muskham, 1; Orton, 3; Park Leys, 1; Ratcliffe-upon-Soar, 5; Rolleston, 1; Ruddington, 2; Sookholme, 1; South Collingham, 1; South Muskham, 3; Southwell, 1; Stanford-upon-Soar, 1; Stapleford, 1; Staythorpe, 1; Sutton Bonington, 4; Thrumpton, 1; Thurgarton, 2; Upper Broughton, 1; Upton, 1; Warsop, 1; West Leake, 1; Willoughby-on-the-Wolds, 2; Wilford, 2; Winkburn, 1; Wollaton, 1; Woodborough, 1. **Rutland:** Burley, 2; Cottessmore, 2; Exton, 2; Greetham, 3; Horn, 1; Langham, 2; Market Overton, 1; Oakham Dean's Hold with Barleythorpe, 1; Oakham Lord's Hold, 1; Stretton, 2; Teigh, 1; Thilston, 1; Whissendine, 3. **Shropshire:** Bedstone, 1; Bettws-y-Orwyn, 1; Bitterley, 1; Bucknell, 2; Burford, 1; Caynham, 1; Clee St. Margaret, 1; Clun, 3; Clunbury, 2; East Hamlet, 1; Greet, 2; Halford, 1; Holdgate, Ar. Bk.; Hope Baggot, 1; Hope Bowdler, Ar. Bk.; Leintwardine North, 1; Llanvair Watdrine, 1; Mainstone, 1; Nash, 1; Sibdon Carwood, 1; Stokesay, 1; Stoke St. Milborough, 1; Whitton, 1; Wistanstow, 1. **Somersetshire:** Barrow Gurney, 1; Redminster, 1; Brislington, 1; Butcombe, 2; Chew Magna, 2; Chew Stoke, 2; Farmborough, 1; Flax Bourton, 1; Long Ashton, 1; Marksbury, 1; Nempnett Thrubwell, 1; Preston, 1; Stanton Drew, 1; Stanton Prior, 1; Stowey, 1; Whitchurch, 1; Winford, 1; Wraxall, 1; Wrington, 2. **Staffordshire:** Cannock, Ar. Bk.; Canwell, 1; Drayton Bassett, 1; Harborne, 4; Hints, 1; Norton under Cannock, Ar. Bk.; Rowley Regis, 4; Shenstone, 1; Tamworth, 2; Upper Arley, 4; Wersford, 1; West Bromwich, 1. **Suffolk:** Alpheton, 2; Barsham, 2; Battisford, 2; Beccles, 2; Benacre, Ar. Bk.; Boxted, 2; Bradfield Combust, 1; Bradfield St. Clare, 2; Bradfield St. George, 1; Bradwell, 1; Brandon, 2; Brent Leigh, 2; Burgh Castle, 3; Buxhall, 1; Chelworth, 1; Cockfield, 2; Coddesham, 1; Couba, 3; Creeping St. Mary, 1; Crowfield, 1; Drinkstone, 1; Earl Stonham, 1; Emswell, 1; Exning, 1; Felsham, 1; Fordham, 1; Fornham All Saints, 1; Gedding, 1; Ghemsford, 1; Great Finborough, 2; Gorleston, 1; Hamstead, 1; Hartest, 1; Hawkedon, 2; Hensett, 1; Hitcham, 2; Horningsheath, 2; Iwerth, 1; Kessingland, Ar. Bk.; Lakenheath, 2; Lavenham, 2; Little Finborough, 3; Little Saxham, 2; Long Melford, 3; Mettingham, 1; Monks Eleigh, 2; Moulton, 2; Nettlebaston, 1; North Cove, 1; Norton, 1; Peasenhall, Ar. Bk.; Preston, 2; Ringshall, 1; Riaby, 1; Santon Downham, 2; Shimpling, 2; Shipmeadow, 1; Somerton, 3; Sotterley, Ar. Bk.; Stanstead, 2; Thetford St. Cuthbert, Ar. Bk.; Thetford St. Mary, 2; Wattisham, 1; Westley, 2; Weybread, 1; Whetstead, 1; Worlingham, 2. **Warwickshire:** Alveston, 3; Aston, 3; Atherstone upon Stour, 4; Barleston, 1; Barton on the Heath, 5; Bidford, 2; Brilles, 1; Birmingham, 2; Cherington, 5; Eatington, 2; Great Wolford, 6; Ilmington, 4; Ipaley, 2; Kingsbury, 3; Little Compton, 3; Little Wolford, 6; Long Compton, 6; Lower Shuckburgh, 2; Loxley, 3; Ludington, 1; Middleton, 3; Napton on the Hill, 3; Old Stratford, 3; Polesworth, 1; Priors Hardwick, 4; Priors Marston, 9; Salford Priors, 1; Seckington, 1; Shuttington, 2; Solihull, 1; Stourton, 3; Stratton on the Floss, 3; Studley, 1; Sutton Coldfield, 10; Sutton under Brilles, 1; Tamworth, 6; Temple Grafton, 1; Upper Radbourn, 2; Upper Shuckburgh, 5; Welford, 4; Weston upon Avon, 1; Whichford, 2; Whitchurch, 4; Wolhamcote, 4; Wormleighton, 1. **Worcestershire:** Abberley, 1; Alderminster, 5; Aldington, 1; Alvechurch, 1; Badsey, 2; Belbroughton, 1; Bengeworth, 3; Bentley Pauncefoot, 2; Beasley, 6; Bewdley, 1; Blockley, 5; Blockley, 1; Bredon, 3; Bredon's Norton, 1; Bretforton, 4; Brickhampton, 2; Broadway, 5; Bromsgrove, 2; Bushley, 2; Chaceley, 2; Charlton, 1; Church Honeybourne, 4; Cleve Prior, 4; Clifton upon Teme, 1; Conderton, 3; Crothorne, 1; Daylesford, 3; Dodderhill, 2; Dormston, 3; Eastham, 1; Eidersfield, 1; Elmley Castle, 5; Evenlode, 4; Feckenham, 4; Frankley, 1; Grafton Flyford, 1; Grafton Manor, 1; Great and Little Hampton, 2; Great Witley, 1; Hanbury, 3; Hartlebury, 1; Harvington, 1; Himbleton, 1; Hindlip, 1; Huddington, 1; Inkberrow, 5; Kidderminster Foreign, 4; Kings Norton, 6; Kingston, 1; Knighton on Teme, 1; Lindridge, 1; Little Comberton, 2; Littleton, 1; Longdon, 1; Lower Milton, 1; Lower Sapey, 2; Martin Hussington, 1; Martley, 1; Netherton, 2; North and Middle Littleton, 4; Northfield, 1; Oddingley, 1; Offenham, 2; Oldberrow, 1; Overbury, 3; Redditch, 2; Ridgacre, 1; Ripple, 3; Romsley, 1; Salwarpe, 1; Sedgeberrow, 4; Stock and Bradley, 2; Stoke Prior, 4; Strensham, 2; Teddington, 2; Tiddington, 1; Tutnall and Cobley, 2; Upper Milton, 1; Upton Warren, 1; Webbeath, 4; Wickhamford, 4; Yardley, 1.

ASIA.

Asie Orientale.—Carte de l' —, comprenant l'Empire chinois, le Japon, les états de l'Indo-Chine et la Malaisie. Paris, Andriveau-Goujon. 2 sheets. Price 3s. (Dulau.)

Yemen.—Carta Originale dello —, secondo i rilievi di Renzo Manzoni (1877–1880) e le esplorazioni anteriori di Niebuhr 1762, Seetzen 1810, Cruttenden 1836, Botta 1837, Passama 1842, Arnaud 1843, Halevy 1873, Maltzan 1873, Stevens 1873, Millingen 1873, Schapira 1877, Langer 1882, le carte degli Ammiragliati inglese, francese, italiana, ed altri materiali costr. e dis. G. E. Fritzsche. Scale 1:1,000,000 or 13'6 geographical miles to an inch. Istituto Cartografico Italiano, Roma 1885. (Dulau.)

— (El-) meridionale ed il Belad El-Engris second. le esplorazioni di Renzo Manzoni dal settembre 1877 all'aprile 1880 costr. e dis. G. E. Fritzsche. Scale 1:750,000 or 10'3 geographical miles to an inch. Istituto Cartografico Italiano, Roma 1885. (Dulau.)

AFRICA.

Afrika.—Spezial-Karte von —, im Massstab von 1:4,000,000 or 55·5 geographical miles to an inch. (10 Blatt) entworfen von Hermann Habenicht, bearbeitet von demselben, Bruno Domann und Dr. Richard Lüddecke. I. Lieferung, ausgegeben bei Gelegenheit der Feier des 100 jährigen Bestehens des Hauses Justus Perthes in Gotha, September 1885. To be completed in 5 parts, each price 3s. (*Dulau.*)

This map is published in commemoration of the centenary of the well-known firm of Justus Perthes, Gotha. All the most recent reliable authorities have been consulted in its compilation, and the author, in the letterpress which will accompany each issue of two sheets, will give the sources from which his information is derived. When finished, the map will consist of 10 sheets, and judging by the part already issued, promises to be one of the best general maps of Africa that have been published. As an instance of the pains which have been taken to bring this map up to date, the recent explorations made by Mr. Grenfell up the Liboko (or Mobangi) tributary of the Congo will be found to be laid down. The map is printed in colours, and all lines of ocean communication, with the several colonies situate up the coast, are shown.

Central-Afrika.—Fr. Bohndorff's Reisen in —, in den Jahren 1880 bis 1883. Nach den Itinerar-Aufzeichnungen des Reisenden entworfen und gezeichnet von Bruno Hassenstein. Scale 1:1,000,000 or 13·6 geographical miles to an inch. Petermann's 'Geographische Mittheilungen,' Jahrgang 1885, Tafel 16. Justus Perthes, Gotha. (*Dulau.*)

Suakin.—Sketch of the country adjacent to —. Scale 1:100,000 or 1·3 geographical miles to an inch. Compiled at the Intelligence Branch, War Office, 1885, from reconnaissance sketches by the Officers of the Intelligence Department, Suakin Field Force, March 1884, and March, April, and May 1885.

AMERICA.

St. Domingue.—Carte Politique de —. Par MM. Leyritz, Levassor, and Bourjolly, Colons-Propriétaires. An. XI.—1803. Tirage de Juillet 1885. Scale 1:600,000 or 8·1 geographical miles to an inch. Price 6s. (*Dulau.*)

PACIFIC OCEAN ISLANDS.

Caroline Islands.—Sheet of Maps to illustrate the Caroline Islands dispute between Germany and Spain. Various scales. W. & A. K. Johnston, Edinburgh and London. 1885. Price 1s., coloured.

This sheet contains a general map of the Caroline Islands, with an enlarged plan of Yap, a map showing the position of the Caroline Islands with reference to Spain and Germany, and another showing the Spanish and German possessions in the Pacific Ocean.

CHARTS.

Admiralty.—Charts and Plans published by the Hydrographic Department, Admiralty, in July and August 1885.

No.		Inches.		
1951	m	=	1·85	England, west coast:—Liverpool bay. Price 2s. 6d.
2296	m	=	0·3	Bothnia gulf, sheet 1:—South Quarken to Hornslandet. Price 2s. 6d.
2298	m	=	0·3	Bothnia gulf, sheet 3:—Nystad light to Stör Fiord. Price 2s. 6d.
2299	m	=	0·3	Bothnia gulf, sheet 4:—Hornslandet to Stierno point. (Plans, Barsta Hamn, Skagens Hamn, Ulfö sound, Juni Skären anchorage.) Price 2s. 6d.

		Inches.	
2300	m	= 0·35	Bothnia gulf, sheet 5:—Stierno point to Fiäderäg, and Stör Fiord to Gamla Karleby. Price 2s. 6d.
2343	m	= {0·45 7·0 }	Häiti or San Domingo:—Samana bay. Approach to Santa Barbara. Port Santa Barbara. Price 1s. 6d.
899	m	= 0·2	North America, west coast:—San Diego bay to Conception point, including Santa Cruz and the adjacent islands. Price 2s. 6d.
901	m	= 6·0	Red sea:—Sawákin harbour. Price 1s. 6d.
914	m	= 10·5	Ceylon:—Colombo harbour. Price 1s. 6d.
84	m	= 2·3	Bay of Bengal:—Chittagong river. Price 1s. 6d.
239	m	= 2·0	Bay of Bengal:—Vizagapatam. Calingapatam. Balasor road and river. Price 1s. 6d.
2759a	d	= 1·0	Australia, northern portion, with adjacent islands and seas to the equator. Price 2s. 6d.
2759b	d	= 1·0	Australia, southern portion. Price 2s. 6d.
2645	France, west coast, sheet 6:—Plan added. Port Concarneau.		
292	Newfoundland:—New plan, Femme harbour. Plan added, Mercer cove.		
750	India, west coast, sheet 12:—New plans. Quillon road. Alipee roads.		
2056	Sunda strait:—New plan. New Anjer road.		
2576	Sulu archipelago:—Plan added. Port Bongao.		
731	Gilbert islands:—Plans added. South passage. Peacock and Espiegle anchorages.		
(J. D. Potter, agent.)			

CHARTS CANCELLED.

No.		Cancelled by	No.
1951	Liverpool Bay	New plan, Liverpool bay	1951
2296	Bothnia gulf, sheet 1	New chart, Bothnia gulf, sheet 1	2296
2298	Bothnia gulf, sheets 3 and 4 ..	New chart, Bothnia gulf, sheet 3	2298
2299	Bothnia gulf, sheet 5	New chart, Bothnia gulf, sheet 4	2299
2300	Bothnia gulf, sheet 6	New chart, Bothnia gulf, sheet 5	2300
292	Newfoundland, plans of anchorages on south coast	New sheet of plans, Red Island road, Great Jervis Harbour, Frenchman Harbour, Gaultois and Picarpe harbours, Femme harbour, Mercer cove	292
2343	Samaná gulf, entrance	New chart, Samaná bay. Plans port Santa Barbara	2343
2797	Santa Cruz, Santa Rosa, San Miguel, and Anacapa islands ..	Republished chart, anchorages off the coast of California ..	2797
901	Sawákin harbour	New plan, Sawákin harbour ..	901
84	Chittagong river	New plan, Chittagong river ..	84
2759a.	Australia, northern portion ..	New chart, Australia, northern portion	2759a
2759b.	Australia, southern portion ..	New chart, Australia, southern portion	2759b
1373	Plan of Ushuwia harbour on this chart.		

CHARTS THAT HAVE RECEIVED IMPORTANT CORRECTIONS.

No. 1698. England, south coast:—Dover bay. 1170b. England, west coast:—Holyhead to Liverpool. 2010. England, west coast:—Morecambe bay. 1118 a. b. Shetland islands. 606. Ports in the Shetland islands. 2306. Norway, west coast:—Rondals island to Hitteren island. 2611. France, north coast:—Dieppe to Boulogne. 1542. Mediterranean:—Syra island. 2059. North Atlantic ocean.

275. Arctic:—Smith sound and Kennedy channel. 2866. United States:—Winyah bay and George-town harbour. 762. West India islands, sheet 2. 763. West India Islands and Caribbean sea, Sheet III. 1639. Gulf of Mexico:—Mississippi river to Boquillas Cerradas. 1577. North America, west coast:—Columbia river. 253a. Gulf of Tejurah:—Jibul Jarne to Sayara. 813. Ceylon, south coast. 2403. Eastern archipelago:—Singapore strait. 792. Malacca strait:—Dinding islands and channel. 942b. Eastern archipelago:—Eastern portion. 2062. China:—Tonking gulf. 876. China:—Hainan strait. 1258. China:—Approaches to Séoul river. 1256. China:—Pechili and Liautung gulfs. 2441. Japan:—Strait of Tsugar. 1047. Australia, west coast:—Cape Ford to Buccaneer archipelago. 518. Australia, west coast:—Shark bay. 2764. Australia, east coast:—Coral sea and Great Barrier reef, sheet 2. 1344. Pacific:—Juan Fernandez. F. Index chart:—Africa. M. Index chart:—West coast of North America.

German Charts.—Die West-Patagonischen Gewässer zwischen Golf von Trinidad und Golf von Peñas. Scale 1:300,000 or 4·1 geographical miles to an inch. Seekarten der Kaiserl deutschen Admiralität, herausgegeben vom hydrograph. Amte. No. 89. 2 sheets. Berlin, D. Reimer. Price 3s. (*Dulau*.)

United States Charts.—No. 932. West Coast of Mexico, Maldonado to Ocos River. Surveyed by the Officers of the U.S.S. 'Tuscarora' in 1878, and of the U.S.S. 'Ranger' in 1882, Commander J. W. Philip, U.S.N., commanding.—No. 938. West coast of Mexico. Chamela Bay. Surveyed by the Officers of the U.S.S. 'Ranger,' Commander J. W. Philip, U.S.N., commanding. January 1882.—Pilot Chart of the North Atlantic Ocean. September 1885. Published at the Hydrographic Office, Navy Department, Washington, D.C. 1885.

ATLASES.

China, Atlas von —. Orographische und Geologische Karten von Ferdinand Freiherr von Richthofen, zu des Verfassers Werk: China, Ergebnisse eigener Reisen und darauf gegründeter Studien. Erste Abtheilung: Das Nördliche China (zum zweiten Textband gehörig). Erste Hälfte: Uebersichtsblatt, Vorerläuterungen und Tafeln 1 bis 12:—Tafel 1 und 2, West-Shantung. 3 und 4, Ost-Shantung. 5 und 6, Liau-tung. 7 und 8, Mukden. 9 und 10, Yung-ping-fu. 11 und 12, Peking. Zweite Hälfte: Tafel 13 bis 26:—13 und 14, Ta-tung-fu. 15 und 16, Tai-yuën-fu. 17 und 18, Ping-yang-fu. 19 und 20, Hönan. 21 und 22, Hsi-ngan-fu. 23 und 24, Tsin-ling-shan. 25 und 26, Pau-ning-fu. Dietrich Reimer, Berlin, 1885. Price 11. 5s. each part. (*Dulau*.)

The preface which accompanies this atlas contains a most interesting and instructive description of the steps taken by the author, and the material used in the preparation of the maps, which, when completed, will certainly form one of the most valuable contributions to geographical and geological science, that has appeared for some years. The amount of foresight, which a perusal of his preface shows to have been exhibited by the author, and the methodical and persevering manner in which the survey work has been carried out, impart to this atlas a character, that has seldom been reached in any publication of the same class.

At the time when his work 'China,' was written, Baron von Richthofen had every reason to expect that the completion of his atlas would shortly follow, but the introduction of mountain ranges, the writing, the geological features, as well as some necessary alterations, contributed to delay its publication.

When Baron von Richthofen undertook his journey, reliable maps of China were not in existence, excepting the English Admiralty charts, which showed the greater part of the coast-line, two navigable rivers, the lower courses of the Yang-tse-kiang, Pei-ho, and some mountain peaks. The maps of the interior

of the country were, for the most part, reproductions of d'Anville's atlas of the Chinese Provinces (published 135 years ago), prepared by command of the Emperor Kanghi, from information obtained by the Jesuit missionaries, and another map based on these astronomical observations had been prepared by Dr. H. Berghaus in 1843, and published by J. Perthes, Gotha. From the earliest times the Chinese had produced graphic representations of their country, based on the courses of rivers and distances between known places, but as they were not acquainted with any system of graduation or the method of fixing positions by astronomical observation, their maps were very inaccurate. The preparation of the Jesuit map was therefore an event of great importance; they recognised the value of establishing fixed points from which other positions could be laid down, and these were in course of time adopted as the basis of their maps. The result of the Jesuits' survey was published in Wuchang by order of the Governor-General of Hu-kwang in 1863 (a copy of this is in the Society's collection), and is called 'Ta-Tsing yi-tung yu-tu.' It is on the scale of 1:1,000,000, and comprises more than the whole empire, extending as far north as 80° lat. On account of its large size, 23 × 33 feet, it was for convenience sake published in thirty-two books, and although it is a rough production, and its detail frequently obliterated by Chinese characters, it is nevertheless, to a great extent, reliable as regards the hydrography; every river indicated has its existence, and their general directions are tolerably accurate.

With these maps, Baron von Richthofen started on his journey, and they considerably assisted him in correcting the detail and topography along his route. Those portions, which they contained, were reconstructed on an uniform scale of six geographical miles to an inch, and in course of time a great number of such sheets were completed. The topography and geological formations, from personal observation, and native information, were carefully laid down for a considerable distance on both sides of the route. In his endeavour to make his survey as perfect as possible, the author's labour was considerably augmented. In the selection of native information Baron Richthofen exercised great discretion, and it was only after careful consideration that he decided to adopt that which appeared to be the most probable.

The first part of this atlas contains an index sheet showing the arrangement of the maps, which are all constructed on the same scale, viz. 5.75 inches to one degree of latitude, or natural scale 1:750,000. When the atlas is completed, a general map of the Chinese empire on the scale of 1:3,000,000 will accompany it.

In the preparation of these maps Baron von Richthofen obtained much valuable assistance from Dr. R. Kiepert, some of the details being taken or reduced, where necessary, from the Wuchang map, without the introduction of imaginary windings of rivers, thus avoiding the appearance of a careful survey. The coast-line has been taken from the English Admiralty charts, and fixed astronomical positions have been strictly adhered to, and the maps of the Jesuits have only been used for the interior after careful consideration, and eliminating the errors known to exist. These errors proved to be few in the northern and central parts of the map, but farther south, on the Si-kiang, they increase considerably. The existing difference in positions of the Jesuit maps will be shown with the completion of the atlas. Rivers taken from the Chinese map are indicated by dotted lines, but the distinction of the rank of towns ("fu, chow, ting"), market places, military and post stations, villages, &c., could only be partially indicated, owing to want of sufficient information. All main, and other roads are shown in distinct characters. The orthography is revised and corrected by Mr. C. Himly, interpreter at the Consulate in Shanghai, and adapted in such a way that the pronunciation of names would be understood by educated Chinese. In the delineation of mountain ranges, the author not only consulted the Chinese, but all other existing maps, which, however, unfortunately differ considerably; and this is the more astonishing, as during his four years' journey their extent and direction, appeared to him, to be comparatively simple and clear. The topographical features are chiefly taken from Baron von Richthofen's own sketches, but are by no means intended as an exact representation, and only indicate the general

direction of the ranges. The heights given along the author's route (which is distinguished by a line of small stars) are from his own observations, taken with two aneroids, which were several times carefully tested and the errors applied in the calculations. The geological maps are not alone the result of his own investigations, but a careful combination of all the existing material and information which could be obtained, and the parts for which there is no data are left uncoloured on the maps.

Baron von Richthofen modestly assumes that the present work, which truthfully represents the results of his journeys, will fill up a small gap in knowledge of a part of the world of which we know so little, and although far from being perfect, will form for future travellers some starting-point and encouragement for further exploration.

It would not be proper to close a notice of this sort without making some special reference to the manner in which the maps have been produced. Each district has two maps, one geographical and the other geological; the topography in the latter having all hill work printed faintly so as to admit of the geological colouring showing distinctly. An examination of these maps shows the registering to be nearly faultless, and such excellent results could only have been arrived at by an exercise of the greatest possible care, combined with skill of no ordinary kind.

The atlas will consist of fifty-four maps, twenty-seven orographical and twenty-seven geological.

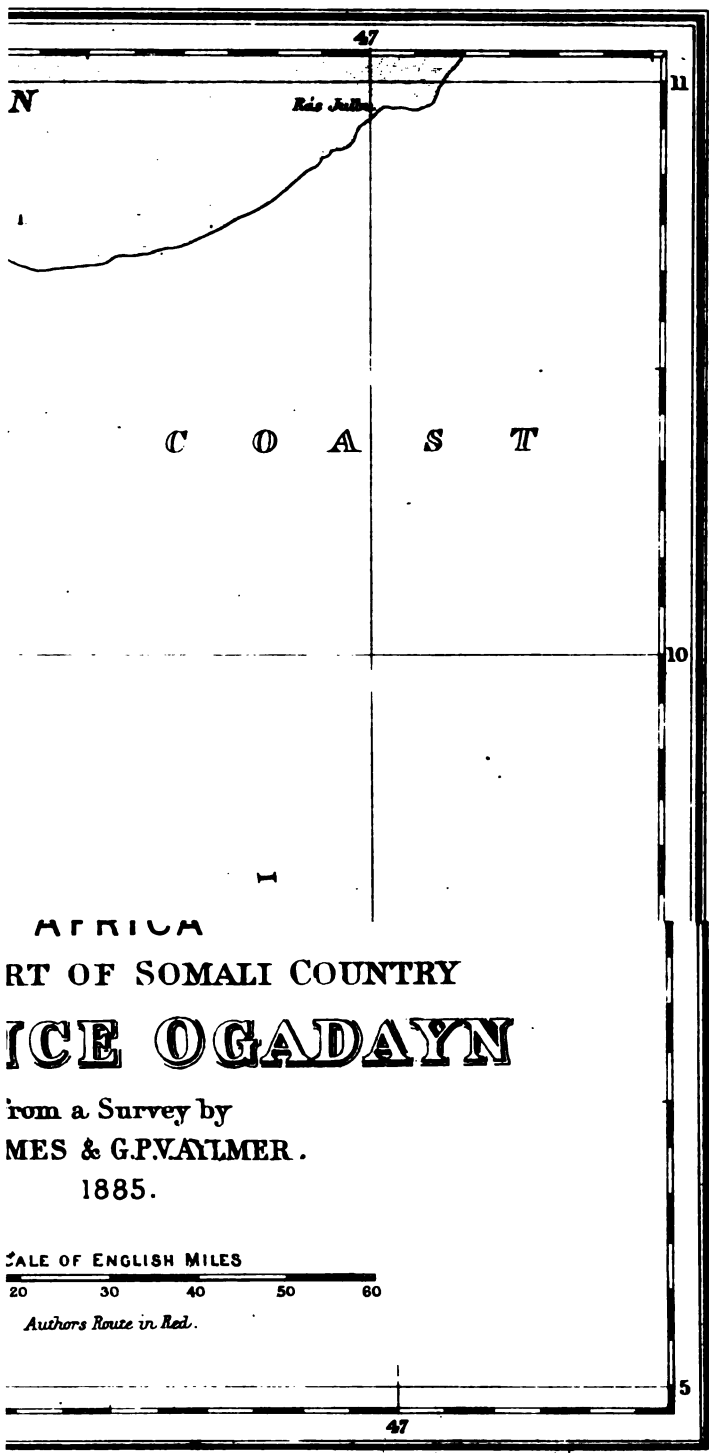
EDUCATIONAL.

British Colonies and Possessions.—School map of —, on an uniform scale (1 : 7,603,200 or 104·1 geographical miles to an inch). Size, 50 inches by 58. Price, mounted on rollers and varnished, 13s. E. Stanford, London, 1885.

This map includes the Empire of India, and all the British Colonies and Dependencies, each of which has a different projection, suited to that portion of the earth's surface on which it is situated, but an universal scale, of 120 statute miles to the inch, is adhered to in each map, so that a comparison as to the magnitude of one colony with reference to any other, can be made at a glance. Though this system is doubtless attended with some drawbacks, inasmuch as the smaller colonies, such as the West India Islands, Mauritius, Seychelle Islands, &c., are represented by mere dots which convey no idea, as to their conformation, to the mind of the student, yet this unavoidable disadvantage is more than compensated for, by the facility afforded in comparing the areas of the larger British Colonies, such as the Dominion of Canada and Australia, about which students very frequently have erroneous ideas. The names of the several colonies are engraved in very dark type, their chief towns, and largest seats of population are also given, the colouring employed is such as to attract the eye, and the map, as a whole, is well calculated to meet the purpose for which it has been published.

Victoria.—School map of —. Scale 1 : 610,000 or 8·3 geographical miles to an inch. A. Johnston, London. Mounted on rollers, varnished.

This map, which is drawn in a bold style well suited for educational purposes, exhibits the progress which the extension of the railway system in the colony of Victoria has brought about, as will be noticed by the number of towns which have sprung up in the vicinity of the several railways. The four principal districts, and thirty-seven counties are clearly shown, and the populations of towns are indicated by the manner in which their sites are marked. There are two inset maps, one of Port Phillip with Melbourne on an enlarged scale, and another of Australia, on a reduced scale, intended to show the position of Victoria with reference to the other Australian Colonies.



AFRICA
RT OF SOMALI COUNTRY
ICE OGADAYN

rom a Survey by
MES & G.P.VAILMER.
1885.

SCALE OF ENGLISH MILES

20 30 40 50 60

Authors Route in Red.

Edw^d Waller, lith.



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The Rivers of the Punjab.

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Map, p. 776.

THE Punjab receives its name from the rivers which give to the country its distinctive geographical character. The name, as is well known, means "five waters." And these five waters are the five great rivers which, united, flow into the Indus about 500 miles above its mouth. They are the Jhelum, Chenab, Ravi, Beás, and Sutlej.

In early times the country was called the land of the "seven rivers," this number, seven, including, in addition to the five just named, the Indus itself on the one side, and the Saraswati on the other.

The modern British province which we call Punjab, the country marked off for administrative purposes as the charge of the Punjab government, is not thus bounded by the distinct lines of one river system. Beyond the Indus, on the west, it reaches to the line of hills that runs for a long distance nearly parallel to the river. And beyond the Sutlej, on the other side, it includes a large tract of plain country as far as the Jumna, a river which has different geographical relations.

The ancient seven-river-land had very distinct river boundaries as then understood, and as described in certain ancient writings. The eastern boundary, the Saraswati, has a somewhat obscure history, and presents an interesting geographical problem. The Indus and the other five rivers take their rise in the snows of lofty mountains, and are great streams at all times, being fed from unfailing sources. The Saraswati, on the other hand, rises in the low outer hills, and, receiving its water from the periodical rains only, and the springs which they supply, it is nearly dry for great part of the year, and at flood seasons is quickly filled with a great body of water, which pours violently down and runs rapidly off. It has all disappeared before it can reach the Sutlej or the Indus. But in the ancient writings referred to, it is described as a mighty river like the others.

Let me mention briefly what these ancient writings are, and what they have to say to the geography of this part of India. The earliest knowledge we have of this country and its inhabitants relates to the immigration of a people of the Aryan race from the north. These are the ancestors of the Hindus. This immigration took place, as well as can be determined, about 1500 B.C. (a little before the exodus of the Israelites from Egypt). For a length of time this Aryan people occupied the seven-river-land, as they called it, before they began to advance further into India. Certain of their sacred books, written during this time, contain descriptions of some geographical features of the country, particularly in the shape of hymns addressed to the rivers. Though the information thus furnished cannot be credited with any scientific accuracy, it is not altogether without value in relation to the geography of to-day. In these Vedic poems the Saraswati is addressed as a mighty stream of the same kind as the other rivers, and in terms implying great size and importance. It is called the "most beautiful of the seven sisters"; "first of rivers, rich and pure, flowing down to the sea"; "the Saraswati our protection," evidently looked upon as a great river which was a safe frontier. The name, which means "having running water," seems to mark it as a constant as well as powerful stream. It is applied as an epithet to the Indus and other great rivers. What is the change that has taken place?

The tract of country through which the Saraswati and other similar periodical rivers near it and connected with it (Gaggar, Markanda, Chitang, and others) take their course, was formerly more cultivated, peopled, and wooded, than it is now. There are remains of many villages and towns, but little of the old forests. Clearance of forest has no doubt a good deal to do with the altered condition of the country and its rivers. It has been the practice also, when water was scarce, to throw dams across the channels to hold up all that could be had. Then, lower down, where water seldom came, the wind and sand filled up the river beds, as happens in many places at the present day. If a great change in the character of the Saraswati can be thus accounted for, still, rising so near the plains, it can scarcely ever have been a continuous stream of great volume, worthy of being described in the terms applied to it in those old days.

Now in later writings, the date of which is about the sixth century B.C., this famous river is said to sink into the earth and to pass underground to join the Ganges and the Jumna at their confluence. It had ceased, according to this idea, to be one of the seven rivers. It had no connection with the other six. The people had now crossed their boundary river and advanced into India. They had become acquainted with the Ganges and the Jumna. These were now their sacred streams, and their confluence, Prág, now Allahabad, was a place of special virtue.

* The word is applied to large rivers as well as to the sea.

Had they by this time come to know the Saraswati better, to find out that it was not the kind of river it was thought to be when it was less perfectly known and had not been crossed, or perhaps when it had only been seen in flood? And then had they come to think that its ancient credit would be best upheld by taking it underground to Prág (which now, as the meeting-place of three sacred streams, receives the epithet Tribéni)?

Was there then, ever, in the place of these dry channels, a river such as the Saraswati is described to have been? One answer to this question has been given in the supposition that the Sutlej, which makes a somewhat abrupt turn westward near Rupal, soon after issuing from the hills, once took the more direct course south-west, and that it was the Saraswati. It is not impossible that the Sutlej may once have followed that line, but the supposition is not well supported. It has been said that the Sutlej is not mentioned by the historians of Alexander, who speak of the other four great rivers emptying themselves into the Indus, and it is inferred that in his time it cannot have been where it is now. But, as was long ago observed by Lassen,* Alexander went no further than the Beás, and, to the Greek historians and geographers, this river, which was the terminus of his expedition, was the furthest thing in the country they had to mention. To which it might be added that the Saraswati also is not mentioned, but this does not imply that it was not there. Also that the seven rivers of the old Indian writings include both the Sutlej and the Saraswati? And that it was about three centuries before Alexander's time that the Saraswati had lost itself in the sand.

A change there had been before then, but a change, we may reasonably suppose, not so much in the river itself as in the people's knowledge of it. After all, the Vedic hymns which use these high-flown descriptions, while containing many useful facts, are not books of history or science but of poetry and nature-worship. Something may be attributed to the Oriental love for expressing completeness by the number seven, and to a natural desire to find something worthy of special mark in the seventh river, which they looked upon as the boundary of the land they claimed for the Arya or noble race.

We must not conclude that the interesting question can be finally disposed of in this way, but there seems to be enough in causes that are apparent, and changed conditions which are known, to explain the state of things that now exists.

The river Sutlej, whether flowing as at present or by the other line, is the natural eastern boundary of a great tract of hill and plain country enclosed between this river and the Indus. These rivers have their sources very near to each other, on the sides of the mountain Kailás (lat. 31° 4', long. 81° 15' E.). The Indus main line rises on the north

* 'Pentapotamia Indica,' 5.

side of the mountain at a height of about 18,000 feet. The Sutlej on the south side issues from the lake Ráwan Rad (connected with the Manas Saráwar lake), at a height of about 15,200 feet. The Gár branch of the Indus rises on the south side of the mountain, close to one of the sources of the Sutlej.

The courses of the Indus and of the Sutlej have a general similarity, taking first a north-west and then a south-west direction, the larger river making a wider sweep, which separates it about 350 miles in direct distance at the widest part from the Sutlej, that is, from the sharp turn of the Indus near Gilgit (lat. $35^{\circ} 50'$, long. $74^{\circ} 45'$) to the bend of the Sutlej near Rupar (lat. $30^{\circ} 58'$, long. $76^{\circ} 35'$). And they unite in the south of the Punjab, above Mittan Kót (lat. $28^{\circ} 58'$, long. $70^{\circ} 23'$), the Indus having run about 1350 miles, and the Sutlej 950 miles. Within this ring are situated all the other Punjab rivers, from source to confluence, with all their tributaries and all their drainage ground.

From their rise to their final exit from the hills these rivers have all a character generally similar. Now they are foaming torrents, dashing down narrow rocky channels with wild force, then rushing on with current less riotous if not less rapid, and at length, with slackened speed and all the gathered volume of many such like streams, sweeping down, broad and deep, into the plains. But this is not an unvaried plan. The Indus, for instance, as it passes through Ládák, flows for a long distance in an open valley at a height of 11,000 feet, over a sandy bed, with gentle and winding current, a smooth surface, and divided stream. The Sutlej too passes smoothly through some bits of comparatively open country in its journey through the hills. But the most notable and well-known piece of slack running of a great river through high level land among the hills is the upper part of the Jhelum in Kashmir. The river rises near Vir-nág at the south-east end of the valley and flows north-west through the middle of a wide plain. It receives several tributaries, some of equal size to the main river. It passes the capital, Srinagar, about 70 miles from the source, and 25 miles lower down it spreads over a broad depression in the plain and forms the Wular Lake. Leaving this lake near the town of Só-púr (which suffered so severely in the late earthquakes) it runs south-west 18 miles to the gorge at Baramúla. This is its course through the lovely valley of Kashmir, a little over 5000 feet above the sea, where it is a sluggish but beautiful river, with a large amount of lazy and luxurious boat traffic. It is a single channel, but some of the tributaries have streams much divided. From Islámábád, where several of these streams join, down to Srinagar, 40 miles, the fall is four feet per mile. Then to the Wular Lake and out of it to Baramúla, 43 miles, only about $2\frac{1}{2}$ feet per mile. But now comes a change. From this place, Baramúla, the only river exit from the valley of Kashmir, the river which has been creeping along so quietly now dashes down

between precipitous rocky banks with a fall of 35 feet per mile for 75 miles, to the town of Muzaffarábád. And here joined by the Kishanganga (or, we might say, joining it, as the Jhelum makes a very sharp turn to the south, adopting the course of its tributary), it runs on with a fall of 21 feet a mile to its entrance on the plains of the Punjab. Here again it begins to be a boat-bearing stream. Its whole descent, from the source to the plains, is thus made suddenly, in a short distance in the middle of its course.

The earliest of a series of four metrical histories of Kashmir, in Sanscrit,* states that the valley was formerly a lake, which was drained by a powerful sage cutting the gap at Baramúla, by which the Jhelum now escapes. In the actual physical condition of the country we can see some ground for the tradition. Bernier, referring to this story, which he was told in Kashmir in 1664, suggests that the gorge at Baramúla was rent by earthquakes, which, as he says, and we have reason to know, are frequent in that part of the country. M. Troyer, the translator of the Sanscrit history just referred to, thinks it was the work of man, taking advantage of the facilities presented by the narrow neck of land which closed in the great lake at that end. It has otherwise been supposed that the river of old had a free flow, with pretty uniform slope from the source to the junction of the Kishanganga, that it was blocked below Baramúla by landslips, and that when the barrier, after many ages, partially burst, the lake, which had been held up, subsided, and the river made its way down by a rapid fall to its old channel.

The other rivers have their general fall in the more usual order, the high slope at the head decreasing in successive portions to the low flat run of the Delta. The Indus has an average fall of 24 feet per mile from the source to Iskardo, 600 miles; 17 feet per mile to Attock, 440 miles; from Attock to Kalabagh, 110 miles, 50 inches per mile; Kalabagh to Mittan Kót, 370 miles, 12 inches a mile; and 470 miles Mittan Kót to the sea, 6 inches a mile. The Chenab has two chief upper streams, the Chandra and the Bhaga, and the river below their junction is called by their joint name, the Chandra-Bhaga. They both rise on the Bara Lacha range at a height of about 16,500 feet. The Chandra in its 115 miles down to the junction at Tandī, which is 7500 feet above the sea, falls upwards of 70 feet per mile; the Bhaga has little more than half the length with twice the fall. From Tandī to Kishtwar, 115 miles, the river falls at the rate of 34 feet per mile, and thence 180 miles to Aknūr at the foot of the hills, 26 feet per mile. The Ravi, the smallest of the five rivers, has its source at a height of 16,000 feet and a rapid descent at the rate of 115 feet per mile, in its hill course of 130 miles. The Beás rises in the Rotang Pass, at the head of the Kulu valley, close to the source of the Ravi, but at a lower height. To Lárji,

* *Raja Tarangani*, the first of the series being written by Kalhana, about the middle of the 12th century.

75 miles, its fall is 125 feet per mile, and in the next 25 miles to Mandi rapidly goes down to 40 feet a mile. Then for 150 miles it falls at 11 feet per mile. This river is noted for the beauty of its scenery in the hill part of its course. Of all the Punjab rivers the Sutlej has the most equable slope in its way down to the plains. At 240 miles from the lakes at its head (the place where it is crossed by a large timber bridge a few miles above Shipki) its height above the sea is 8400 feet, the descent per mile to this place being 32 feet, and it has the same average fall in the next 300 miles to Rupar.

In their passage across the plains the rivers have a character generally similar, with some distinctions. The slope is small and decreases as they descend towards the sea. They do not keep to one course or to one form in any part of their course. The changes are the results of two kinds of action, destructive and constructive. They cut away their banks and build others. They have two ways of destroying their banks; in the flood season by direct force of the stream at a high level, and softening of soil submerged, and in the low season by quiet undercutting at the water-level, which brings down enormous masses of high bank that fall forward one after another into the stream with loud and repeated roar. The soil thus carried away is part laid down on shelving banks on the other side, part in the bed, forming shoals and shifting islands; part settling down across the mouths of branch channels, closes them up and cuts off their supply of water, till another turn of events lets water into them again; and part is swept down the stream to the delta and the sea. All this is familiar to us on rivers in all countries flowing through such plains. There are long stretches of river bank on the Mississippi which very exactly resemble those of the Indus, and which the river treats in exactly the same manner.

The changes caused by the cutting of banks and formation of new ones are often of large amount and importance. No one of these rivers is at any time exactly where it was the year before. The town of Mittan Kót, just below the common confluence of all the rivers, has twice (according to the ordinary way of speaking of it) been carried away. But this does not describe exactly what happens. For though, no doubt, many buildings and much property on the banks of all these rivers are annually swept into the river, this is seldom done without warning. And when the people see it is inevitable, they try to move in time to some place farther back, or some other part of the river-side that seems more secure. When surveying in Upper Sind, and engaged in recovering positions I had mapped the year before, I missed a village that was in my books, and on inquiry it was pointed out to me on the other side of the river. The people had got unmistakable notice to quit, and they flitted over the water. The river had cut in more than half a mile from its bank of the year before.

The Ravi, which is the smallest of the five rivers, has the most

winding course in the plains and great tendency to change. Bernier, when at Lahore in the end of 1663, preparing to go to Kashmir with the Emperor Aurangzib, writes that the city was built on one of the five rivers, which may be compared in size to the Loire, and which he says was equally in need of a dyke to check the mischief it does in its frequent changes of bed. He said the king's palace was then no longer on the river bank as it used to be, the stream having receded a quarter of a league, to the great inconvenience of the people. (I had a river-gauge set up one year below the palace, to which side a part of the stream had returned. I believe it has never been there again since.) The emperor to whose suite Bernier was attached built a long masonry facing to the river bank on this side, and now it would appear it had begun to threaten the other. For some time before the British occupation of the Punjab, the river had been encroaching on the opposite bank and was cutting away a corner of the enclosure of the Emperor Jahangir's tomb at Shahdara. To prevent its going further and endangering the beautiful tomb itself (erected by the emperor's widow, 1630) the river was encouraged to lay down silt on that side and make a new bank. This it did, and it now runs fairly away, with a good breadth of new land between the stream and the place it had damaged. The same thing has had to be done elsewhere on this river. On two occasions our military station Dera Ismail Khan has been threatened by the Indus, and protected by river works which turned the main stream into channels that took it to a safe distance. These rivers have not only the habit of changing from right to left within a great width of general course, but also, like rivers elsewhere, occasionally take up a new line altogether. Considerable lengths of an old bed of the Ravi are to be seen some miles to the west of its present course. The Chenab, the Beas, and the Sutlej also have left old beds with which they have no connection now. Parallel to the lower Indus is a long piece of river channel, in which part of the stream is believed at one time to have run.

In a straight run, where these rivers do not tear their banks or change their course, they have still the power of making other alterations by deep plunging of their bed. When the first railway bridge across the Sutlej, between Ludiana and Fitor, was built, the pier foundations were carried down to a depth of 70 feet. A heavy flood scooped out the bed under one of these piers, bringing down with it two spans of the fine bridge. There seems to be a direct downward action of a strong current meeting a vertical resistance of this kind, which cuts the bed more deeply than a free unobstructed stream. Yet the Indus 20 miles below Attock, with its continuous high velocity and great volume, has cut a central trough which is believed to be about 180 feet in depth. At Attock, which the river approaches in a wide and divided channel with low velocity, the depth is only 22 feet at low water. This favoured the project of a tunnel under the Indus. The

small trial gallery was driven the whole way, opening communication, in 1863, from side to side under the river, with shafts on either side. The projected road tunnel was not carried out, and a railway bridge now spans the Indus at this place.

A bridge over such a river, at such a place, is much concerned with the amount of rise of the river in floods. The Indus channel which is open and divided before reaching Attock, here narrows between rocky banks, and the river therefore rises to a great height. A height of 50 feet in flood season above the lowest level at other times is common, with a velocity of 13 miles an hour. At Mári, 90 miles lower down, the highest rise is only 17 feet above low-water level. In a flood of a remarkable kind in 1858 the rise of the river at Attock was 80 feet; and in the flood of a similar kind in 1841, the rise is believed, from the information obtained (the Punjab was not ours then), to have reached a height of no less than 92 feet. The other Punjab rivers have wide open channels in the plains, and while their volume is largely increased in the flood season their rise is told in more moderate figures, the maximum between 10 and 15 feet.

The ordinary rises of these rivers are due first to the melting of the snows and then to the periodical rains. The rise from melting of the snows, which begins in March, is slow and regular, but not uniform. Snow-melting on the high hills is checked by frost during the night and early morning, and goes on again during the day. The fluctuation in rise, which sensibly affects the rivers in the upper part of their course, is little perceived when they come out, broad rivers, into the plains. The temperature of the Indus water, in the cold weather of the plains, has been found to be 5° below that of the air (64° and 69°, February). In the beginning of the hot weather, when the air is warmer and the river is bringing down snow-water, the difference is 14° (87° and 101°, June). At greater depths the difference is still more, a fact of which practical advantage is commonly taken by the English residents in the fort of Attock, by letting down to the bottom for some hours anything which it is desired to cool.

The greater ordinary rises of the rivers are from rain, that is, rainfall on the hills from which the rivers come. All of these rivers and their feeders have their source within the broad tract of grand hill country which stands between the great lowlands of North India and the wide outspread highlands of Tibet. This vast mountain region, bearing the common name Himalaya, includes a number of lofty ranges, in a general way parallel, and stretching north-west and south-east. The main annual rainfall in North India is that swept up from the surface of the Indian Ocean by the south-west winds of the summer monsoon. The first of the parallel ranges of mountains that is high enough to catch, and cold enough to condense, the water-laden air-stream, receives copious rain on its seaward side, while the other side of the mountain wall gets little

or none. The same thing is repeated on ranges beyond. It is a curious and striking thing to see. Crossing the hills into the valley of the Sutlej on one occasion in the height of the monsoon, I went up the south side through soaking rain and rank vegetation to the very pass, and on descending the ice and bare slopes on the other side all was dry. No rain for weeks, till, as I came back across another range on the north side of the Sutlej from the valley of the Spiti, this experience was reversed, and crossing from the dry and bare north side, the descent on the other was again in heavy rain amid luxuriant greenness and the roar of dashing streams. How quickly the little mountain torrents uniting form a river can be seen on those magnificent hills in time of summer rain. The same thing is to be seen on a smaller scale in the western lake countries of Scotland and England. There are places in Cumberland where ten times as much rain falls on the windward side of a hill as on the other. The arrest of some of the monsoon clouds in the Himalaya goes on at all the lofty ranges that stretch along the great belt of mountains. Thus the quantity of rain that is carried by the wind becomes less towards the further or Tibetan side, and the monsoon wind arrives there vapourless. So also the annual snowfall is less towards that side, and snow is permanent down to a lower level on the ranges near the southern than on the ranges near the northern margin of this great mountain land. And again, just as the first of the high ranges on the south side of the chain shelter the valleys next beyond them from the moisture that comes from the south, so the ranges nearest the other side of the chain screen the country behind them from the dry heat of the high land on the north.

The main stream of the Indus, then, comes from a drier part of this chain of mountains than all the other Punjab rivers. But this has little effect on its volume except on the upper part, for besides its numerous affluents direct from the great glaciers, it receives a large amount of drainage from the hills south of its main stream, more favoured with abundance of rain. It drains an area estimated at 372,000 square miles. Even at its lowest, in winter, it is 500 feet wide at Iskardo, and nine or 10 feet deep. The upper Jhelum (called by its old name the Behat (Vitasta) in Kashmir) has that valley for its definite drainage area, but receives important tributaries, the chief of which is the Kishanganga. The Chandra and the Bhaga, which united form the Chenab, are both great streams, receiving large supplies of water from both snow and rain on the south face of the Bára Lácha range. The valley of the Ravi, in its short course among the hills, is partly deprived of monsoon rain by the hills which on their south side—the side of the Kangra valley—send down an exceptionally large amount to the Beás. The average annual rainfall at Dharmsala, overlooking the Kangra valley, is 140 inches. The Sutlej has a long course through dry country, but a large amount of drainage from the spurs of the Kailás range. This whole wide area

of mountain range, the birth-place of the Punjab rivers, is full of varied interest to the geographer, and to others besides.*

The *local* rain in the country through which these rivers flow in the plains affects their rise in comparatively small degree, though it of course adds something to their volume, and may cause very serious flooding of level land which drains slowly. Each of the Punjab rivers after leaving the hills crosses a tract of steadily decreasing rainfall on its way towards the sea. The Indus and the Jhelum enter on the plains in country that has 36 inches of average annual rain. On the Chenab where it leaves the hills there fall 48 inches in the year. The Ravi and the Beas get 34, the Sutlej a little less. These are the amounts of local rain where they first come out into the plains. At 50 miles from the foot of the hills the rivers are receiving from 16 to 24 inches a year of local rain, the smallest amount in the west. A hundred miles farther they are in a belt of country that gets from 10 to 12 inches of rain. And at length, in the region where the rivers all unite, no more than 6 inches of rain fall in the year. And still less further south, in Sind.

The moisture-laden current sweeps over Sind, but no vapour is condensed; air so hot and so unchecked can carry all that water without dropping any. A range of mountains on the coast of Sind would make the monsoon wind yield up some of its moisture before going further, as do the Western Ghâts, not very far off. Mahabaleshwar, 80 miles south of Bombay, has 260 inches of rain in the year to the 5 that fall in Sind. At Mahabaleshwar as much has been known to fall in one day as three times Sind's whole annual supply.

Through this dry country sweeps the mighty Indus, after receiving the contributions of the other rivers. They unite before reaching the Indus, and enter it as one, bearing the name *Panj-nad*, or five streams. It is 50 miles in length from the last confluence, that of the Chenab and the Sutlej. When they meet, the Panj-nad is more than twice the width of the Indus, but its mean depth is much less, and its velocity little more than one-third. Its discharge at the low season is about 69,000 cubic feet per second, that of the Indus 92,000. Below the junction the flood discharge is about 380,000 cubic feet; in exceptional floods much more. One, in the month of August, was estimated at 460,000 cubic feet per second.

All this wealth of water comes from the Indian Ocean, to which

* It was perhaps a personal knowledge of these Himalayan heights that suggested the description given (with a special application to something else) in a recent poem:—

“an alpine land
Whose lofty peaks look wrapt in cloud and snow;
But spacious prospects those dim heights command,
And from their seeming-sterile regions flow
The great main springs, whose streams as they expand
Refresh and fertilise the world below.”

Lord LYTTON, *Glenavril*.

most of it goes back again. Were the area covered by this ocean land instead of water, we should have a very different state of things and no such Punjab rivers.

When the measure is taken of the water in a river flowing in a wide channel in soft soil, we do not at any time get the whole of it. We measure what is flowing above the bed, but there is more below. It sinks down till retained by some impervious stratum, and may become something like a second river flowing under the large one which we see. It happens sometimes that the whole of a small stream sinks into porous soil and disappears, and if a retentive stratum which it meets below comes out to the surface at a lower part of its course, the filtered water will pour out and become a surface river again, after the ordinary manner of springs. This does happen with some rivers, and it gives some ground for the story about the Saraswati. The experiment has been made on the Jumna of shutting off the whole visible river with a weir and turning it into the canals on either bank. A few miles down, the water trickles down into the bed again, and further down there is a river as before. In most river beds, like those of the Punjab, when they are left dry at the sides in the low season, water is to be got under the dry bed, as well as under the river, and usually at no great depth. Plenty of water can often be got by scooping a mere hole. The water supply of Lahore is pumped from wells sunk in the bed of the Ravi. The water which sinks beneath the beds of these great rivers finds a wide field of hidden usefulness open to it when it gets below. Spreading abroad it meets, and helps to make, the great underground lakes and springs on which every country so largely depends. In the rainless tract around the meeting of the rivers in the south of the Punjab, this underground reserve of water is abundant and near the surface; for the most part it is less than 24 feet below the ground, and in a great part of the country less than 10. In the distribution of these underground reserves of water there are great variations, according to the varying extent, form, and positions of the dividing walls of impermeable soil. The admission of water to new canals is commonly followed by the rise of the water-level in wells within a certain distance on either side. The drying of streams lowers the well-level. In the dry tract south of the Sutlej many wells are over 100 feet deep, some more than 170, with only three feet of water.

The Indus after receiving the other rivers carries down into Sind in the high flood season turbid water containing silt to the amount of $\frac{1}{4\frac{1}{2}}$ part by weight or $\frac{1}{4\frac{1}{5}}$ by volume, equal to 6480 millions of cubic feet in three months of flood, with a discharge of 380,000 cubic feet per second. In the low season, with a discharge of 68,000 cubic feet, the silt is $\frac{1}{5\frac{1}{2}}$ by weight or $\frac{1}{10\frac{1}{4}}$ by volume. The Ganges often carries even more. The effect of these enormous quantities of silt on the sea-line at the mouths of great rivers, when the deposit of sediment is

undisturbed by coast currents and little affected by tidal scour, is readily understood. The silt is very fine sand and clay. The rapid diminution of slope after the rivers leave the hills, checks the transport of larger matter of any kind. Small rolled stones have been found in the Indus only as far down as five miles below Kalabagh. The stones found in the river near Haidarabad in Sind are local. Part of the silt carried by such rivers is employed in raising the bed of the river itself, where the fall is slight and the flow languid, and then in overflows raising also the banks. Thus the Indus below Sukkur for nearly 400 miles of its course, runs on an embankment made by itself, with a long gentle slope on both sides down to the general low level of the country. While this presents facilities for conveying the water by means of irrigation canals from the river to lands at a distance from it, it also makes the country liable to be flooded by escape or overflow, and increases the difficulty of restraining it when this is required. I was once engaged for a length of time, on a day in the first week of July, in an unequal contest with this big river, which made a breach in a long earthen river-bank that had been hastily thrown up a short time before, to protect a tract of low country from inundation. The utmost efforts of an army of work-people to defend the two ends of the breach and prevent its widening were unavailing with water that had this command of height. It was but a petty side-blow that the Indus was giving, but it was not to be denied.

Mention has been made of certain floods of an unusual character which caused an astonishing rise of the Indus at Attock. One of these floods occurred in 1826, another in 1833, another much larger in 1841. But more is known of the latest, in 1858, when the country was in our hands. In July of that year it was observed at Attock that the river was not rising as fast as usual, and it was seen that there must be an obstruction somewhere, as in 1841. On the 8th of August, the pent-up waters burst their barrier, and rushed down with irresistible fury.* The river rose at Attock, as has been mentioned, to 80 feet above its low-water level. The most striking effect of the flood was this, that the Kabul river, which joins the Indus at right angles above Attock, coming down with a very uniform slope of two feet per mile, was forced back by the Indus flood and driven *up* stream at a rate of upwards of 10 miles an hour. Meeting the river coming down, it overflowed both banks with great force and inundated the military station of Naoshera, which was almost destroyed. The people first got the alarm—and it was some-

* "Like as a water-streame whose swelling sourse
 Shall drive a mill, within strong bancks is pent,
 And long restrayned of his ready course,
 So soon as passage is unto him lent,
 Breaks forth, and makes his way more violent."

Faerie Queene, book vi. canto 1.

thing to be alarmed by—seeing the river running the wrong way with a velocity greater than its ordinary downward current, but no exertion could avert the damage that followed. Haystacks swept up stream by the Indus, drove against the boat-bridge, and carried it away. Then came the flooding of the cantonment. Some of the larger buildings afforded a precarious refuge on the roof to those who had not fled to higher ground. One of the sufferers described to me how from the top of his house he had looked down on the troubled sea that was swelling around him, and saw his books and furniture washed out at the doors. There were scenes of sad destruction at many places on the banks of the Indus, and very heavy loss of property, though not so much loss of life as in 1841. At Attock the flood continued two days at the maximum height. The obstruction which caused the 1833 flood, according to information received by Mr. Vigne, when travelling among those hills at a later date, was due to the slipping of a glacier on the upper course of the Shayók river (the chief hill tributary, which joins the Indus after a course of 350 miles). The others were similar in their cause, at different places. The late Mr. Hayward, on his explorations in Gilgit in 1870, mentions a temporary obstruction of this kind forming a lake in the Gilgit Valley, in which valley also he believed the flood of 1858 to have originated. It has been attributed, with more probability, to a landslip near the sharp southward bend of the Indus, 70 miles below Iskardo. A flood of similar kind is said to have occurred on the Sutlej in 1762.

It will readily be supposed that a land intersected as the Punjab is by great rivers which flow in one united stream to the ocean, that is, which has a great water highway *from* the sea, sending out branches that divide the land among them, is eminently provided with means of water communication. The map would seem to say so. But when we know the characters and habits of the rivers, we readily understand that the facilities for navigation are not quite what they seem. Great hopes have been entertained at various times of a large steamer traffic on the Punjab rivers. It was one of the purposes of sending Lieut. Burnes by water to Lahore in 1831 with the presents for Ranjit Singh, to see what could be made of river traffic with the Punjab. In 1835 the first steamer was seen on the Indus. A small steamer passed up that river once as far as Attock. Steamers have ascended the Sutlej to a little above Firózpúr, the Jhelum to Pind Dadan Khan, and the other rivers shorter distances. A regular steamer service was maintained for some time on the Indus up to Mokhad, 25 miles above Kalabagh. But to all these attempts at steam navigation, above 600 miles from the sea, the obstacles presented by the shifting nature of the streams and shoals involved expenditure of time and money not warranted by the traffic return. Steam navigation of these rivers is now practically confined to the part from Tatta at the head of the delta up to Multan. No doubt much

could be done by means of river works to keep open some permanent navigable channels. But river conservancy in this sense was too costly a business to be adopted throughout. It is found better where steam navigation is kept up, to maintain a system of local pilotage. Though these rivers are not well fitted for steamers, even of very light draught, there is a large amount of boat traffic, and a brisk trade in boat-building at places near the foot of the hills where the timber brought down by the rivers from the deodar forests is received. There are at present between 5000 and 6000 boats of large size, constantly employed on the several rivers. From April to September the wind is from the south, favouring upward traffic. For the rest of the year it blows in the opposite direction. A long time ago, before the days of steamers, and when not much was known about the rivers, there were English people who looked somewhat vaguely for great things on these unexplored highways. A gentleman who joined the East India Company in May 1609, wrote four years later that there were "many far-fetched projects on foot how to draw all the traffic of Persia and the inland parts of the East Indies up the river Hydaspes (Jhylum) into the Oxus, that falls into the Caspian Sea," thence "to be brought up the Volga."

Without being inclined to revive the project in this form, with the modern advantage of steam power, we may yet desire to see something done for the furtherance of steam navigation on the Punjab rivers. They are nature's gift, of no small value—it is for us to see what we can make of them. Though the hindrances are considerable they are to be overcome if there is sufficient motive. The rivers, though on the whole very unmanageable, can yet to some extent be managed and turned to account. On the one hand we find it needful to protect the land against the water, on the other we find it useful to draw the water on the land. Few things can be of higher importance to a hot and dry country than the wise use of available surface water. Artificial irrigation supplies the wants of ill-favoured times and ill-favoured places. If it is one of its most important purposes to secure in bad times (that is, on failure of the periodical rains) the products of land abundantly fertile in ordinary seasons, so as to have at all times, on certain areas of country, harvests that can be depended on, it is likewise its purpose to lead these surface streams to "fresh fields and pastures new"; to plant verdure in the desert; to make possible the production on new ground of the kindly fruits of the earth; to send out refreshing streams and furnish supplies of water for man and beast; to make more abundant and more accessible the water to be obtained from the ground; to repair the damage done in past time by ignorant, perverse, or short-sighted men, and help to restore the wealth of wood that once sheltered and enriched the soil; by this means also to draw down in more abundant measure the bounty of nature from the skies, to nourish and to reproduce what has been raised. This is something we can do to make changes for the better in the face of the

land, if the rivers of themselves are sometimes apt to make changes for the worse. As they make their way across the broad low plains of India, which they have helped to make, they let us see the wealth of their resources for good or evil. Controlled and guided, led and regulated, they serve to show instructively the power of man's influence on the physical as well as the political geography of a country.

Notes on the Physiography of Southern India.

By Col. B. R. BRANFILL, late Deputy-Superintendent, Survey of India.

(Read to the Geographical Section of the British Association at Aberdeen,
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THE part of India on which I have been invited to offer some notes, culled from the recollection of many years' service passed there, lies to the south of lat. 15°. It is the apex of the Peninsula, and coincides nearly with the Madras Presidency of British India. It is a beautiful country, displaying a charming variety of surface and scenery. Its climate, though tropical, is mild and generally agreeable, being almost insular, and subject to the breezy influences of the two monsoons. It is an epitome of all India, in its lofty hills and extensive plains, its flooding rivers and dwindling lakes, its fertile flats and sterile wastes, its tropical jungles and its scrubby wilderness.

Southern India is an interesting field of observation for the scientific inquirer, and especially for the physiographer, on account of the elements of physical change it displays in ceaseless activity. For, we have first, the decomposing and disintegrating power of the sun's rays, vertical here twice in the year; secondly, we have the long continued strong winds, that scour the surface and transport immense volumes of dust to great distances in the air, and, by means of the waves, along the sea-shore; and thirdly, the dissolving and denuding force of a tropical rainfall.

Frost is only known upon the high plateaux and mountains, and the violent earthquake is almost unknown, but the agencies just mentioned seem fully adequate, in process of time, to convert a vast plateau of igneous rock into the subdued and diversified area we now behold.

For our present purpose, Southern India may be divided into three tracts or regions. Firstly, the mountainous region of the Ghâts, including the higher tablelands, and the great upland plains of Mysore, contained between the brows of the Western and Eastern Ghâts. Secondly, the lowlands of the Malabar coast, all that narrow tract of moist seaboard between the foot of the Western Ghâts and the Arabian Sea; and, thirdly, the comparatively wide and dry lowland plains of the Carnatic, between the eastern foot of the Ghâts and the Bay of Bengal.

The first is the highland tract, wide in the north, but tapering to a

point at Cape Comorin, that completely separates the other two. The latter differ more, however, from the effects of the seasons than they do from their geographical position.

The year in Southern India has three distinct seasons: the south-west monsoon, from May to September; the north-east monsoon from October to February; and the hot season, from March till May, between the two monsoons. The term *monsoon* is our rendering of the Arabic word *mausim*, which properly means *season*. The south-west monsoon is the most striking and beneficent fact of the climate, for it brings the rains, that revive all living things, when almost parched to death by the hot season, and that fill the rivers and lakes, which fertilise the land and temper the ardent rays of the vertical sun. The amount of the rainfall is very uncertain, and occasionally there is little or none, except on the Ghâts. The dates of its commencement and ending are equally uncertain; but the *wind* of this monsoon is most regular in its onset, force, and continuance. It blows with the force of a strong breeze for four months, from May to September, all over the Arabian Sea, from the south-west. Within 80 or 100 miles of the west coast it becomes a westerly wind, and so continues across the Peninsula. On first striking the coast and ascending the abrupt barrier-wall of the Ghâts, it loses its excess of moisture, which falls in torrents of rain on their sides and summits, until it has passed the crest of the heights. It then continues its eastward course, as a cool, moist breeze at first, but gradually gets warmer and drier, until at last it becomes a fierce hot wind, a veritable *sirocco*.

In the Bay of Bengal, the wind of this season becomes southerly, and afterwards blows up the valley of the Ganges as a south-east or easterly wind, almost diametrically opposite to its course over Southern India.

The wind of the south-west monsoon is usually supposed to be the great continental sea-breeze of Southern Asia, induced by the excessive rarefaction of the air over the interior and most heated portions of the continent; and so, doubtless, it is; but in the marked deviations from the normal direction, just noted, we see an anomaly, the reason for which is not so obvious.

The south-west monsoon dies out fitfully in September, and after a short interval, is succeeded by the north-east monsoon, which is supposed to be only the normal trade wind. It is ushered in by storms and heavy falls of rain, which replenish the rivers and tanks, to the east of the Ghâts, and render the cultivation of all the unirrigated plains possible. The north-east monsoon usually lasts till February, accompanied by some spells of rainy weather, which rapidly bring to perfection the cold-weather crops, as they are called. Of cold there is really none, except on the mountains, but the day temperature is very pleasantly cool, and the nights are quite chilly.

In February the cool northerly breezes fail, and the days get warm. The cold-weather crops are harvested, and all its vegetation rapidly dries up.

The succeeding hot-weather months, March, April, May, may be briefly but fitly described as hot, hotter, hottest. But the heat of Southern India is seldom very great or oppressive, being tempered, at first by the land- and sea-breezes, which prevail at this time of year, and later by occasional dust-storms and thunder-storms, frequently accompanied by heavy showers, which cool and clear the hazy atmosphere most agreeably. These occur so regularly between the middle of April and the middle of May, that they are often termed the "petty monsoon" rains; a misnomer, of course, except that they are thought seasonable at a time when the regular monsoon breezes are out of season. They are rather accidental tornadoes, and are by the natives termed *tufán*, our word "typhoon." *

The best time for visiting Southern India is from September to March, but the naturalist, the explorer, and the physical observer, need not be deterred from making a prolonged tour, as, by taking advantage of the variety of climate offered by the hill tracts, the upland plateaux, and the lowland plains, and visiting each at its best season, the whole year round may be spent in a comparatively cool and enjoyable climate, without incurring any serious danger or discomfort.

Without laying down any fixed time or precise route, we may advantageously go over some of the most interesting physical features of the country, as follows, commencing with the extreme north-west of the country under notice.

Let us proceed by sea down the west coast of India, merely noting the endless panorama of beautiful scenery; a surf-beaten shore-line, sometimes bold with dark rocks or bright-red laterite cliffs; sometimes lightened with a brilliant streak of shining yellow sand, but always backed up by the luxuriant foliage of endless groves of coco-nut palm and evergreen bush, completely concealing the narrow belt of lowlands to the very foot of the Ghâts, which raise their dark cliffs and lofty summits, at a few miles distance inland, their skirts and valleys clothed with primeval forest. The antiquity of the forest on this coast is proved by the petrified trees which are found submerged under the sea; and an account was published some years ago in the volumes of the Royal Asiatic Society of Bombay, of petrified trees having been found at the bottom of a shaft, sunk many fathoms through the rock (laterite and trap) on this coast; and curiously enough, if I recollect aright, some of them were marked by notches and cuts that exactly resembled the cuts of an axe! If so, they must have been the marks of Parasu-Râma

* Compare the Greek word *τὸ φάν*, "a whirlwind"; also the Chinese *tafung*, "great wind."

himself (Râma of the axe), the traditional conqueror, or reclainer, of these lowlands.

The only sheltered harbour for ships on this coast during the south-west monsoon, is that of Kârwâr; but we may now go a little farther south with safety, and land at Honâwar, a small fair-weather port of great beauty and interest, from its extensive wooded estuary, and the extraordinary surf formed on the bar, at the ebb of spring tides.

A short journey by land or river brings us to the *Ghât* or pass by which we must now ascend to the Mysore *Malnâd*, or hill district. *Mala* signifies hill in the South Indian languages. We have it in the name *Malabar*, and as the commonest suffix to the names of hills, all over Southern India, as in Anamalai, the elephant hills. *Nâd* signifies district or country, as in Wainâd, the open district.

The crest of the Ghâts is here about its lowest, being only some 2000 feet high, and the escarpment is broken down and less precipitous here than it is to the southward; this pass therefore is an easy one. The passes generally between the Mysore highlands and the west coast have been much improved of late, and now afford great facilities for enjoying the splendid scenery, and for examining the geology of the country. On this latter subject I shall merely state that the rocks are hypogene schists, overlying a granitic base, which crops out here and there in huge bold masses. Gneissic rocks abound, and a bed of laterite or iron-clay-stone, is a common superficial formation both above and below the Ghâts.

The Gêrsappa waterfalls are near the head of this pass. The river Sharâvati, after draining some 800 square miles of well-watered country, leaps down over a precipice more than 800 feet high at one bound into a deep pool at its base.

During the rainy season the river at the falls is some 300 yards wide and 20 feet deep, but little of the cataract can then be seen for the dense cloud of spray in which the whole gorge is shrouded. The best time for a visit is about January, when it is broken into several beautiful cascades, and the entire chasm may be studied, from the top to the bottom of the abyss.

The Sharâvati is one of the very few streams of any size rising above the Ghâts and flowing westward into the Arabian Sea.

The summits of the hills in this neighbourhood run up to 4000 feet, but on reaching the tableland we see that the Western Ghâts are not, properly speaking, a range of mountains at all. Viewed from the west coast they do appear like grand mountains, but from the eastward, at some distance inland, the line of their summits looks comparatively horizontal, and suggests rather the idea of a battlemented parapet or retaining wall to the plateau, with long ridges of gentle slope leading up to the battlements. This feature, a long ridge of easy slope ending abruptly in a precipice, has an apt local appellation, *Kudurê-Mukh*, or

horse-head. The splendid cliff-summit of this name, overlooking Mangalore, with its precipitous face, over 6000 feet in height, crested with a mane of primeval forest, is the best known instance; but there are others, and this peculiar formation is familiarly known to the natives under this name.

The Eastern Ghâts, in like manner, are the castellated parapet of the escarpment of our great central tableland on its eastern and southern sides; but there is no such well-marked line of precipices as on the west, and the broken ground between summit and base is generally much wider. It is rugged and picturesque, but cannot compare with the Western Ghâts for beauty or grandeur.

The copious rainfall of the south-west monsoon does not reach the Eastern Ghâts, and they are therefore comparatively dry, barren, and devoid of forest, or only sparsely covered with stunted trees, brushwood, and grass.

The tableland of Mysore, between the brows of the Western and Eastern Ghâts, is by no means flat, but undulating from 2000 to 3000 feet above the sea, and its surface is diversified by numerous abrupt boulder-like masses of granitic rock, scattered singly or in groups over the country. Some of them are enormous unbroken boulder stones, projecting from 1500 to 2000 feet above the surrounding plain. There seems a decided tendency for the groups of rocks to arrange themselves in lines, running north and south, or parallel to the lines of the Ghâts, and for their steeper face to be presented to the east. The most prominent of the single rocks have been fortified and occupied as the refuge of harassed tribes, or as the strongholds of robber chieftains, under the name of *durgâ* or *droog* (which signifies "difficult of access") until our own times.

The entire surface of the plateau has a slight fall, generally from west to east, with a watershed in the middle running in the same direction, by which the drainage runs northwards to the Kistna, and southwards to the Cauvery, except the easternmost part of the plateau, which drains directly eastward in several small rivers through the many narrow valleys and gorges of the Eastern Ghâts.

With the exception of the Sharâvati, the drainage of the western highlands, from the very brow of the precipices, is to the eastward. The northern portion is drained by the Tunga-Bhadra and their tributaries, north-eastwards to the Kistna, and the southern portion, south-eastwards by the Cauvery and its affluents.

The larger rivers are perennial, but having for the most part cut for themselves wide and deep rocky channels, are not very available for irrigation or navigation. This is especially the case in the northern parts, but there the famous black cotton-soil plains are found, which produce a crop yearly without irrigation. The smaller streams, on the other hand, have been utilised for this purpose to the utmost extent.

A succession of dams has been constructed across each river bed, by which each valley is converted into a series of reservoirs for the storage of water; the waste from the upper going to supply the next, and so on. This system has been carried out until, it is believed, no room has been left for a new dam, except where an old one has once been made. If one of the tanks near the top of a series is breached during heavy rain, the whole of the chain below is nearly certain to be breached also, and an entire valley thus suddenly deprived of irrigation, until the breaches can be repaired. There are nearly 40,000 such tanks in Mysore (the largest some 20 miles in circumference), with artificial irrigation channels, aggregating 1200 miles in length.

The river Cauvery (Kâvéri) is a splendid instance of nature's bounty utilised. It rises amidst the most magnificent forest-clad heights of the Western Ghâts, within a few miles of the west coast, in the little high-land principality of Coorg, whence it emerges a full-blown river on the plains of Mysore, nearly 300 yards wide and 20 or 30 feet deep. In its course through the province it is bridled by twelve dams, and obliged to irrigate every part of its valley to which its waters can possibly be led.

The old capital of Mysore, Seringapatam (or Srirangapatnam), stands on an island in this river. Abandoned since the fall of Tipu Saib in 1799, the place has relapsed into a state of nature, and is now a pestilential wilderness.

Thirty miles lower down the river is the site of another and much more ancient capital, called Talkâd. The city of Talkâd is mentioned as a great city of the Kongu or Chera kings, in the third century of our era; as fortified by the same dynasty in the sixth century, and as the capital of another dynasty in the tenth; it changed masters again in the fourteenth, and was finally conquered by the Mysore Râja in the seventeenth century. On this occasion the widow of the late ruler, before drowning herself in the river, is believed to have uttered a curse against the conquerors, that they should never beget an heir to succeed them, and that the city itself should be smothered by sand. This curse has been but too well fulfilled—at all events the city has been overwhelmed by sand. It could hardly be otherwise, for it stands at the leeward end of a long sandy reach of the river, during the prevalent westerly winds. The strange thing is that a city should have been built, and have lasted so long, in such a situation. Thirty temples now lie buried in the sand, the pinnacles alone remaining to attest their existence. The hillocks of drift-sand are said to move on steadily at the rate of 9 or 10 feet yearly. We must suppose that this is an instance in which the circumstances, if not the elements of change have altered within comparatively recent times.

A little lower down the river are the beautiful and imposing cataracts of Siva Samundram, more commonly known as the "Cauvery

Falls." The island of Siva Samundram is formed by a bifurcation of the river. The falls occur in both branches, and are about 200 feet in height. The river here has cut back a narrow chasm in the edge of the Eastern Ghâts, and has worn a deep bed for itself in the plateau, for some miles before the final leap into the low country. The island is well wooded and, with the high and steep hill sides, flanking the river bed, makes a beautiful setting for a beautiful sight. It is worth exploring for the deserted chasm of a former cataract, believed to exist in its centre. The maximum flood discharge of the Cauvery here is stated to be nearly a quarter of a million cubic feet per second. The best time for visiting the Falls is between June and September, during the south-west monsoon; at other times the place is said to be unhealthy.

Let us now return to the western highlands, and complete our hurried survey of the hilly region of Southern India.

The Malnâd, immediately within the brow of the Western Ghâts, is an evergreen belt of most beautiful scenery throughout. Bold rocky summits bound the horizon; dense forests clothe the slopes and hollows, interspersed with grassy park-like glades, and open lawns; whilst the sight, or sound, of running water, is ever present in the valleys. It is a most charming country to ramble about in, and very accessible. The population, however, is exceedingly scanty, and the supply and conveyance of provisions is the principal difficulty for the traveller.

The western highlands may be divided into several tracts, each with its own special beauties and peculiarities.

The Nagar Malnâd, to begin with, excels in the variety of its evergreen scenery. In its midst stood the city of Bednor (or Bamboo Town), the once flourishing capital of a local chieftain. Haider Ali, the usurper of Mysore, took it about a century ago, and made it the second city of his dominions, under the name of Haidar-Nagar (the city of Haidar). Its walls were then some eight miles in circumference, containing 100,000 houses, and near half a million of inhabitants. It is now little more than a deserted village, in the midst of overgrown mounds of débris. It is a very damp, rainy place, and Haidar's imported inhabitants have either died out, or could not bear to remain there when his power ceased, and they were no longer compelled to do so.

The southern part of the Malnâd is more open and park-like. The Ghâts recede inland opposite the port of Mangalore, and the evergreen forest gives way to deciduous woods and extensive grass-lands, the increased distance from the sea apparently lessening the rainfall.

The next highland tract to the southward is Coorg (or more properly, Kodag, "the steep"), a little mountainous principality, where the lofty Ghâts again approach the Malabar coast. Its surface is all high hills, clothed with lofty primeval forest and separated by deep, narrow, tortuous valleys, with mountain torrents and babbling brooks. It is the

fit home of a true highland clan, whose history for the last few centuries is as interesting as a romance. The Coorgs have sought our friendship and our rule, to which they are loyally attached. They still enjoy their own customs and local independence, and we may well feel proud of their trust.

The next tract to the southward is the Wainâd (said to mean *the open or field country*, in contradistinction to Malnâd, *the hilly*, and Kodag, *the steep*). It is much less mountainous than Coorg, and abounds with low ridges and wide valleys. It has been largely occupied by British coffee-planters, for whose purpose the very moist climate seems eminently well adapted; but it has, or had, a bad reputation, as being feverish and unhealthy.

The recently commenced gold-mining has lent fresh interest to this tract, and, but for the costliness of our methods, machinery, and men, it would develop largely and pay well. British machinery, worked by Chinese thrift and labour, could hardly fail of success. Rich auriferous veins of quartz crop out everywhere, especially near Dêvâla, the centre of the new gold-diggings. Gold-digging has been carried on here from ancient times, and many old shafts have been found, from 50 to 100 feet deep; and surface diggings have been observed in many parts of the adjacent tracts, in Mysore, Malabar, and the Nilgiri Hills. The enormous quantities of gold, said to have been amassed in the treasuries of Indian kings and temples, in ancient and mediæval times, were very probably no exaggeration after all.

Thus far, the highland tracts mentioned have been part and parcel of the great central plateau, contained between the brows of the Western and Eastern Ghâts. Their general level varies from 2000 to 3500 feet, with isolated points and groups running up to 6000 feet and upwards.

Immediately to the S.S.E. of the Wainâd, we come to the Nilgiri Hills, a nearly isolated plateau, at a much higher level, having a general altitude of 5000 to 7000 feet, with points running up to 8000 feet and more. It is severed from the Wainâd and south-western Mysore, by a remarkable valley, that of the Moyâr, which might almost be termed a *cañon*, being a steep and comparatively narrow ravine, with precipitous sides, clean cut in the Mysore plateau, close to the northern foot of the Nilgiri Hills. It drains from the edge of the Ghâts eastwards.

The Nilgiri (or Blue Mountain) group, may be properly called a tableland, from being surrounded by very steep or precipitous scarps on all sides. The summit generally is a spread of undulating grassy downs, with rounded tops, separated by shallow hollows, or narrow valleys, each threaded by a trickling streamlet, occasionally lost in the little swamps and peat bogs that abound, and usually flanked by the most picturesque strips of sharp-edged evergreen wood, locally known as *Shola*.

The eastern portion of the Nilgiri plateau is the lower; the western

the higher and more wooded, especially at the western edge, where it slopes up rapidly to the peaks and brows of the Western Ghâts, here called the *Kunda* Mountains, some of which exceed 8000 feet in height; but Dodabetta, the "great hill," the highest point, rises from a ridge near the centre of the plateau, at Utakamand. It is a huge conoidal mass, of smooth but steep slopes covered by grass and woods, and attains the respectable elevation of 8640 feet.

The beauties of the Nilgiri Hills are well known, their peaks and precipices, their grassy downs and sheltered hollows, their beautiful moss-covered woods and picturesque nestling sholas, their rippling streams abounding with cascades and fine waterfalls—all made accessible by bridle paths, good roads, and magnificent passes—in short, the scenery enriched by the gorgeous colouring of the tropics is lovely, and the climate almost perfect for Europeans.

To the unsheltered ill-clad native, man or beast, the climate is not altogether so agreeable. They cannot withstand the steady, cold, wet blast of the south-west monsoon, as it storms over the crests of the Ghâts and sweeps along the western downs. Not long ago a large train of pack-cattle reached the top of the pass from the Wainâd one evening, and were left to graze in the driving mist of the monsoon. Before morning they were all dead, and I well remember seeing their bleached bones, scattered over the downs, a few years after. I have seen half-naked coolies from the plains, lying down benumbed by the roadside near the corpses of their fellows who had already succumbed to the cold, though I do not suppose the temperature at the time can have been much below 55° Fahr.

The hardy aborigines, the stalwart Todas, with all their herds of sturdy buffaloes, forsake the western pastures and migrate to the eastern portion of the plateau, where, under the lee of the great Dodabetta ridge they are sheltered from the rain and chilling blasts of the monsoon. Even the wild denizens of the exposed western forests forsake them also, for more sheltered spots, at this season.

The name Nilgiri, or Blue Mountains, is said to be derived from the uncommonly blue tone of the atmosphere, through which these hills are seen from all sides.

Although separated from it by the Moyâr ravine, the Nilgiri plateau may be considered the head of the great central triangular tableland of Southern India.

The Eastern and Western Ghâts having met here, abruptly terminate, and are succeeded in our southward tour, by a very remarkable opening, called the Pâlgât Gap, a low flat passage about 25 miles wide and under 1000 feet in height, leading from the south central lowlands of Coimbatore and Salem, to the Malabar coast.

By what agency this curious gap has been made is not apparent, but at first sight one is tempted to suppose that some large inland sea,

or lake, may at one time have communicated here with the Arabian Sea, and perhaps the black-soil flats of Coimbatore, supposing that to be a subaqueous formation, as some think, lend some colour to the notion.

To the south of the Pálghât Gap the mountains rise again to their full height, under the name of the Anamalai or Elephant Hills, and farther south, as the Travancore Hills. They are also sometimes called the Southern Ghâts. These mountains are more like a true mountain range than the Ghâts to the north, inasmuch as they rise directly from the lowlands on all sides, and their surface is more broken up into large valleys and lofty peaks, than the highlands to the northward, which we have been considering. They are not so precipitous on the west side, indeed their eastern slopes are the steeper of the two. The highest point measured, Anamudi (or Elephant's Brow), is 8840 feet above the sea, the highest known peak in Southern India.

The Anamalai Hills are very little known, being now almost uninhabited, and surrounded by deadly jungles. They are believed, from the accounts of sportsmen and others who have penetrated to their summits, to surpass the Nilgiri Hills in salubrity of climate, magnificent scenery, and fertility of soil; and, from the numerous rude stone monuments found on them, they must have been more populous in former times. Geologically they resemble the Nilgiri Hills and the Western Ghâts.

Adjoining the Anamalai Hills to the east, are the Palani Hills, a lofty plateau, like the Nilgiri Hills, only more distinctly in two steps, the Western or Upper Palanis averaging 7000 feet, whilst the lower tract is only from 3000 to 5000 feet above the sea. The Palani Hills being farther removed from the first violence of the south-west monsoon, have a more equable climate, which is preferred by many to that of the Nilgiris, and, but for the want of inhabitants, offer perhaps a better opening for European settlers.

There are no natural and few artificial lakes in the hills of Southern India, where there would seem to be the greatest facility for making them. What appears to be the site of an old lake, has been discovered not far from the settlement of Kodikānal (or the "cane-groves") on the Upper Palanis, but it is uncertain whether it was of natural or artificial origin. Each of the larger hill stations or settlements has its artificial lake, and Utakamand has two.

The late Mr. W. G. McIvor very nearly succeeded in forming a magnificent lake, with the slenderest of means. He selected the deep narrow throat of a large valley on the Nilgiri Hills, and in a single season of a few months, with the help of a few Chinese labourers only, trained the high-level waters of the neighbourhood to deposit a huge bank of silted soil, 80 feet high in the centre and some 500 feet long, right across the valley. Just before his work was complete, and his waste channels provided, an unusually early and heavy fall of rain

occurred. It poured incessantly for several days. The lake formed and rose continually behind the fresh mud-bank until it topped it. In vain the gallant Scot strained every nerve to save his long dreamt-of creation, by letting off the flood round the ends of the embankment; and he endured the agony and chagrin of seeing his great *bund* cut in two in the middle; and in a few minutes after it was overtopped, the vast bund, and with it his magnificent scheme, melted away to nothing. The scene of such a feat and such a failure is well worth a visit.

There is an unlimited opening for the artificial storage of water on the hills, for driving mills as well as for irrigation purposes. One such scheme may be mentioned, namely the Periyâr project, for turning the Periyâr river which flows to waste on the west coast, from the top of the Southern Ghâts, so as to flow eastwards to the plains where water is so much needed.

To the east of the Palani Hills, groups of similar but minor masses of hills occur as far east as Madura, and from thence northwards, with some considerable breaks and intervals, by Trichinopoly, across the valley of the Cauvery, and again on northwards, until they meet the line of the Eastern Ghâts at the south-east corner of the Mysore Plateau, thus completely surrounding the south central lowlands of Salem and Coimbatore, before alluded to as the possible site of a former inland sea.

From the well-known Shevaroy Hills, near Salem, the hilly tract extends eastward almost without interruption, to within 50 miles of Madras on the east coast.

These masses vary in height from 2000 to 5000 feet. They are found to be unhealthy, and, as the heavy rains of the south-west monsoon hardly reach them, they are comparatively dry and unattractive, and but little is known about many of them. Geologically, they resemble the Ghâts, and are perhaps only outlying remnants of the great tableland of the Peninsula.

To the south of the Palani and Anamalai Hills, the Ghâts continue under the name of the Travancore Hills, at an elevation of 5000 to 6000 feet, to within 20 miles of Cape Comorin, when they drop abruptly to a line of isolated hills and rocky mounts; the last of them to be seen, just awash at low water, a few hundred yards south of the land's end.

There is a large tract of mountainous wilderness south of the Upper Palanis, almost wholly unknown and unoccupied, except by the elephant, the bison, and other wild animals. Amongst the latter may be included a few wild men, of the lowest type, who haunt these jungles in a state of nature, feeding on the fruits and roots they can pick and scratch up with their unassisted fingers in this Garden of Eden.

They can make a fire, but seldom use one, except as a protection from the wild beasts they fear. They can talk a little with their somewhat less wild neighbours, for whom they gather cardamoms, honey, and

other wild jungle produce, in exchange for a little salt, corn, and cloth, the latter to ornament their women rather than to clothe them. Their habitat is sufficiently indicated on our maps by the remark "high wavy mountain covered by impenetrable forest," and that is about all we know of it.

So far my remarks have been confined to the high plateaux and hill tracts of Southern India, considered as one region on account of their common high elevation above the sea.

I named the lowlands of the Malabar coast as the second region, because of its immediate proximity to the Western Ghâts, and because it can best be visited and noticed while we are making the tour of the Ghâts by means of the frequent passes between the highlands, and the numerous ports on this coast, and during the same season of the year, from January to June.

I have mentioned the great beauty of the scenery of this tract, and can here only mention a few of its more prominent physical features.

Generally speaking, the Malabar coast is a low flat shelf of laterite, or iron-clay-stone, between the wall of the Western Ghâts and the sea-shore, deeply scored and worn into great hollows, which are now alluvial flats, scarcely above sea-level, on which the most luxuriant crops (chiefly of rice) are grown.

Spurs and denuded portions of the Ghâts jut out into the lowlands, and occasionally reach the coast-line, as, for instance, at Mount Dilli, more than 800 feet high, near Cannanore. Otherwise the coast-line is low, and devoid of promontories and bays. The violence of the surf and the wash of the current along the coast have caused this evenness of the shore-line, whilst the enormous rainfall of the south-west monsoon, when some 15 feet of rain falls upon the lowlands directly, besides the immense floods poured down from the Ghâts, has filled up the hollows with alluvial deposit. Under these circumstances there can be no harbours, except the openings in the sea-wall, through which the floods force their way; and these are only available for small coasting vessels, owing to their shallowness.

A principal feature of this seaboard tract is the chain of lagoons, or *backwaters* as they are termed, which is almost continuous for several hundred miles. They have been connected by artificial channels, where necessary, so as to take the place of roads, and serve for extensive inland navigation throughout the district.

We may now just notice a few places of interest on the Malabar coast, proceeding as before, from north to south.

Next to Honâwar, which we noticed at first, comes Kandapur, with its beautiful lagoon, studded with high wooded islets, of which our distinguished countryman, Buchanan-Hamilton, wrote towards the close of his extensive travels in Southern India, "I have not seen a more

beautiful country than this." "An old fort, situated a little higher up than the town, commands one of the finest prospects I ever beheld."

A little farther to the southward is Mangalore, a flourishing port at the mouth of the river Netrávati, which is continually shifting between the conflicting currents of sea and river. Maps of recent times show a direct passage into the sea, but more recently a sand-spit has formed in front of it, so as to drive the mouth of the river continually northwards for a distance of some five or six miles, until it has joined the estuary of the next river. At present, the river as it passes along the sea-front of the town, separated from the open sea by a wide high spit of sand, forms a fine harbour for the great concourse of small vessels from every part of the Arabian Sea generally to be met with here.

There is without doubt a tendency for the sand of the sea-shore to shift northwards, even during the south-west monsoon, when the wind is westerly, and from what I have seen myself I am inclined to attribute it to the set of the great ocean rollers, which appear to come mostly from the south-west.

There are many fair-weather roadsteads and little inlets for small coasting craft on this sea-board; but at Cochin there is a larger one giving access to the most extensive system of backwaters, a connected chain of lagoons reaching 200 miles along the coast, and forming one of its most characteristic features.

We must not omit to notice a very strange phenomenon to be seen here and at a few other places. At Náralak and Alapalli there are patches of smooth water in the sea, so that ships can anchor in safety and small boats can land during the height of the monsoon. The cause of this is not well understood, but it is commonly ascribed to mud-banks or floating mud-islands.

The inlet and lagoon at Quilon or Kayan (Kulam) is the last I shall name, and only to mention its extreme beauty. It is very extensive and diversified with high wooded islets, deep bays, and prominent headlands, all overgrown with tropical vegetation, from the summit down to the water's edge.

To the south of Quilon the surface of the country is more broken and undulating, except very near to the coast-line, where it is covered by a dense forest of coco-nut and areca palms, as far as Trivandrum. But towards the southernmost part of Travancore, as we near Cape Comorin, the country becomes flatter again and sandy. The coco-nut palm gives place to the palmyra, and with the exception of the verdure, which continues to the end, the country is very like the plains of Tinnevely.

On passing the end of the Ghâts at Cape Comorin the change is as sudden as it is remarkable. Universal verdure gives place to bare red soil and sandy wastes, and the moist teeming land of the west coast is suddenly changed for the parched sunburnt tracts east of the Ghâts.

The explanation is obvious. The south-west monsoon pours all its

wealth of moisture on the west side of the great barrier of the Ghâts, and has scarcely a drop left wherewith to bless the eastern plains.

Cape Comorin is a low rocky promontory, and has changed considerably within historic times. Eighteen or twenty centuries ago there was a harbour here, and a market for the sale of the pearls obtained from the adjacent oyster-beds. Now there is neither harbour, nor town, nor pearl-oyster left, but only the rocks and the temple of Kanyâ Kumâri (or Kumâri), "the Virgin Maid," which is still, as of old, a resort for devout pilgrims from all parts of India.

There is a tradition current, that the rock to be seen several hundred yards out in the sea at low water, already mentioned, was formerly joined to the land, and this is supported by the statement still believed in the neighbourhood, that fresh water is to be found in a well, or water-hole on the rock, whenever the sea does not break over it. The lee side of such a promontory would have been a splendid harbour.

The sand around the rocks at the present point is of three kinds, and lies curiously levigated, or arranged in separate beds and layers. First there are the coarse water-worn grains of white quartz and felspar, like grains of very large rice; next we see large beds of pure garnet sand; and thirdly, streaks of fine black sand just like diamond gunpowder. These three kinds lie touching one another, but yet quite distinct and unmixed. Before noticing the general characteristics of the country to the east of the Ghâts, let us glance a little farther along the south coast, and first we notice that the flowering and fruiting seasons of the palmyra, for about nine miles east of the cape, are the same as those of South Travancore, whereas here, after a gap of seven miles with no palms, the palmyra of the Coromandel coast flourishes as a dense forest near the coast, with seasons of its own, determined by the north-east monsoon, which now predominates.

The coast of the Gulf of Manâr would seem to have altered in recent times but slowly. Korkai, which has been fully identified by the Rev. Dr. Caldwell with the ancient Kolkai (the *Kolchoi*), mentioned by the Greek geographers as an emporium on the sea-coast 2000 years ago, is now some three miles inland. In the middle ages it was supplanted by Kâyal ("the lagoon"), mentioned by Marco Polo, which is now in turn deserted by the sea and left high and dry inland; whilst Tuticorin, the present port, promises to be silted up and deserted in like manner. Like other rivers of Southern India, the Tambraparni here has apparently shifted its mouth northwards, and may be expected to continue doing so.

The present coast-line—and this remark applies generally to the south-east coast of the Peninsula—is marked by a ridge, or line of sand-hills, with low swampy flats and here and there, shallow lagoons on their landward side; and it is interesting to notice what looks like a new and advanced line of coast in course of formation, in the shape of a reef of

rocks and sand-banks, with occasional islets, running parallel to the present shore, at several miles distance in the sea. The growth of coral is active in the Gulf of Manâr, and the islets are formed to a great extent, from its fragments.

At the head of the gulf stands the island of Râmeswaram, which seems to have joined the mainland till within recent times, and possibly also the island of Ceylon, by the chain of sandbanks and islets called Adam's Bridge, by means of which, according to the tradition, the island of Ceylon was once invaded by the army of Râma from the continent of India.

Whilst the islets and sandbanks are believed to be growing, and the adjacent sea shoaling, the channels do not appear to be silting up; indeed the perpetual scour of the tide, and the monsoon currents, seem more than sufficient to keep open the old channels, and the breaches that have been made in recent times.

A noticeable feature in the meteorology of this coast is the frequent lightning storms, which occur daily, for weeks together, before the setting in of the south-west monsoon, unaccompanied by rain or by any sound of thunder. They are seen along the coast where the land and sea breezes alternate, and along the line of the Ghâts, where the surface current is thrown up into the upper and opposite current of the atmosphere. In this region also the rare phenomenon of interference fringes is very frequently to be seen.

The shifting sand-wastes of south-east Tinnevely are a noteworthy feature peculiar to this part of the country; they are called *Théri*, and occur in patches of red soil crowned by drifting hillocks of bright red sand. They move eastwards with the prevailing wind of the dry season at the rate of several fathoms yearly, overwhelming everything in their course and leaving a desert track of coarse sand behind them. They act as reservoirs, catching all the rain that falls, from 20 to 30 inches annually, and this oozes out gradually from underneath the dry sand-hills in sufficient quantity to irrigate extensive fruit-gardens throughout the year.

We have hardly time to mention the third region of Southern India specified; the plains of the Carnatic, and, in short, all the low country between the Ghâts and the Bay of Bengal, which can only be just noticed. The surface of this region is not flat, but has a good slope from the Ghâts to the sea, and is everywhere slightly undulating. The general fall of the country from west to east is so universal and patent a fact, that the common words for west and east are the same that are used to signify upper and lower. *Mél* means upper or west, *Kil*, lower or east.

Except along the alluvial seaboard from Cape Comorin to Madras, the country is picturesquely broken by bold groups of hills and rocky mounts, the former usually covered by low wood or scrubby bush. It abounds in well-cultivated tracts, the low lands being irrigated to the

utmost, and the uplands all tilled in favourable seasons, that is, whenever the rains accompanying the north-east monsoon are plentiful. Tinnevely, the southernmost district, may be taken as a type of the whole region, with its low alluvial flats and sandy tracts near the coast, its red-soil uplands, and its black soil, cotton-producing, treeless plains. Its rainy season is the north-east monsoon, from October to January. The hot season sets in in March, tempered by sea breezes and occasional storms, and lasts till October—a long period—but the temperature seldom exceeds 100° Fahr. in the shade.

The soils of Southern India are supposed to have been formed for the most part by disintegration and decomposition of the rocks *in situ*; but the black cotton-producing soil has been ascribed by some to subaqueous deposition. This soil is found in many parts of Southern, as well as in Central India, in the high upland plateaux of Mysore and the Deccan as well as in the lowland plains of the Carnatic. It is now, rather, supposed to be a superficial, sub-aerial formation, from the decomposition of argillaceous rocks, highly impregnated with organic matter. It is very fertile, having been cropped year after year for centuries, without manure and without irrigation. Except the small thorny acacia, it does not appear to produce any spontaneous forest or tropical vegetation to account for the organic matter with which it is said to be charged.

The lowlands of South-eastern India are crossed by many rivers, which rise in the Western Ghâts near the west coast, and are flooded by the rains of the south-west monsoon. This water is stopped by weirs or *anekats*, and drawn off by innumerable irrigation-channels to a marvellous extent, so that some of the rivers are emptied before they reach the sea. Deltaic formation on the coast is thus greatly retarded at the river mouths, and under a perfect system of storage and use, would cease altogether. This, however, is far from being the case with some of the greater rivers, the Cauvery for instance, within the area now under notice. Before it reaches the head of its delta at Trichinopoly, the Cauvery has, under native rule, been dammed up more than a dozen times. At the beginning of this century the flood waters had made for themselves a deep wide channel along the north edge of the delta, and the numerous irrigation channels, including the old bed or main channel of the river, were in imminent danger of being left high and dry, to the ruin of the entire district. Since then, under the British Government, fresh dams and waste weirs have been built, and the whole deltaic irrigation system restored.

The river still discharges largely in the freshes, and its mouth is still shifting, like those of other South Indian rivers, northward, and Porto Novo promises to share the fate of Tuticorin. The causes for this shifting are not far to seek, namely the northward set of the wash of the ocean rollers, and the prevalence of southerly over northerly winds during the dry season, when the sand drifts most easily.

The coast-line is doubtless undergoing, geologically speaking, rapid change, from some or all of the causes alluded to in this paper. Many ancient cities and ports on this coast have disappeared from a more accidental cause; the occurrence of devastating storm-waves during the passage of cyclones, such as that of November 1864, when 30,000 persons perished suddenly at Masulipatam. On this occasion, I was told by an eye-witness, a strong wind blew out to sea for some hours; a short period of calm ensued, followed by a violent gale from the seaward accompanied by the storm-wave. When such a wave is reinforced by the regular flood of a spring tide, the devastation effected on a low coast may be better imagined than described.

Many other interesting subjects might be broached if time allowed, but perhaps enough has been said to show that Southern India is a profitable field of observation and investigation for the physiographer, and also a delightful country to visit for its beautiful scenery, and the agreeableness of its mild though tropical climate.

The Geographical Position of Mashhad (Meshed).

By Major T. H. HOLDICH, R.E., Commanding Afghan Boundary Commission Survey.

THE necessity of securing a well-fixed point on which to close the long series of survey operations extending over 1000 miles from India, as well as to secure an initial value for the future extension of geographical surveys either eastwards or westwards, as the future movements of the Afghan Boundary Commission might determine, was so apparent, that about the middle of April Captain Gore, R.E., started from Tirpul to Mashhad for the purpose of fixing such a point, if possible. Mashhad was selected partly because it is the terminus of the Persian telegraph line from Tehran, and it thus offers the best possible chance of an accurate determination of longitude differentially from Tehran, and partly because it is apparently within the limits of Russian geographical operations. Although Captain Gore left in April for this duty, it was not until the end of June that he finally succeeded in obtaining satisfactory results, owing both to the unusual continuance of atmospheric disturbances between Mashhad and Tehran, combined with the incessant presence of clouds at the latter place, which prevented time observations from being taken; and to the constant collapse of the Persian telegraph, which was by no means in perfect working order. His final success was due to the very able assistance of General Schindler (Director-General of Persian telegraphs) at Tehran, who spared no pains towards rendering the results as accurate as possible. Of his own observations at Tehran General Schindler writes thus:—"At last, on Saturday the 20th, we

were able to exchange time signals. I had observed five nights before the 20th and observed one night after it. Every night I took three sets of ten observations each of an eastern, and three sets of ten observations each of a western star. The greatest difference between the eastern and western results was 0·19 second. The chronometer here is very old, and is a chronometer no more. For instance, in the twenty-four hours between my first and second observation nights it lost 1·453 seconds; in the second twenty-four hours, 1·612 seconds; in the third, 1·374 seconds, and in the fourth, 1·205 seconds. After the exchange of time signals I observed again, and found that the chronometer had lost 2·381 seconds in forty-eight hours. Altogether I do not think that the possible error here exceeds 0·30 second, and as Captain Gore's error will probably be much less, the final result for the longitude of Mashhad ought to be right within seven to nine seconds of arc. Captain Gore's result, $59^{\circ} 35' 52'' \cdot 3$, proves that I was right in thinking the longitudes obtained by the later Russian observers to be too far east. Fraser's $59^{\circ} 35' 27''$ (for a place in the south-west corner of Mashhad), and Lemm's result (as corrected by St. John), $59^{\circ} 36' 15''$, are very close."

Captain Gore's time values were obtained by observation with a 6-inch transit theodolite to east and west stars before and after the interchange of telegraphic signals. He reports as follows:—

"The actual chronometer comparisons consisted of three sets of three signals each sent from Tehran, the times of receipt being recorded at Mashhad; and of three similar sets of three signals each sent from Mashhad, and received at Tehran. All signals were break-current signals. By sending in both directions the effects of retardation were eliminated from the mean result. The comparisons agreed well, and I do not think that there is a possible error of more than 0·15 second in the results from this source.

"The observations for time were made by sets of observations to stars east and west, two stars being observed on each side the meridian. The comparisons of chronometers were conducted on the afternoon of the 20th June, and the observations for time on the evenings of the 18th, 19th, and 20th June, giving the following results:—

		Chronometer Errors.						Rate per 24 hours losing.	
		Star E.			Star W.				Mean.
		o	'	"	o	'	"		o ' "
June 18th	..	1	10	43·8	1	10	44·5	1 10 44·05	
				44·1			43·8		3·62
„ 19th	..	1	10	40·6	1	10	40·3	1 10 40·43	
				40·7			40·1		3·63
„ 20th	..	1	10	36·6	1	10	36·6	1 10 36·80	
				37·1			36·9		

"The results are sufficiently accordant, I think, to warrant the assumption that the error of the Mashhad chronometer was known within 0·2 second and probably much closer. Combining this with General

Schindler's account of his work, my opinion is that the resulting longitude of Mashhad is correctly determined well within 0·5 second of time.

"The latitude of Mashhad ("Chaparkhana") was determined by circum-meridian observations taken with the same theodolite to six south stars, balanced by five sets of observations to Polaris out of the meridian, and one set of circum-meridian observations to a north star, the results being as follows:—

By South Star.	By North Star.
° ' "	° ' "
36 17 41	36 17 46
49	32
50	38
47	30
38	36
42	50

General mean $36^{\circ} 17' 42''$, giving a probable error under 2 seconds.

"As the station at the Chaparkhana is not of absolute permanency, the values of latitude and longitude have been transferred by triangulation to the centre of the Imám Rezá Dome, the final result being:—Mashhad, Imám Rezá Dome, λ $36^{\circ} 17' 19''\cdot 5$, L. $59^{\circ} 36' 14''\cdot 4$ E. from Greenwich."

The position of Imám Rezá Dome has also been fixed by triangulation extending from the Kuhsán base. The Kuhsán base is connected with the Indus Valley series of the Great Trigonometrical Survey of India by a long chain of survey operations, consisting of direct triangulation as far as Rudbár on the Helmund; traverse from Rudbár to Chaharburjak, where the route turned northward, and from thence connected triangulation either from short independent bases, or from bases fixed by observations for latitude and azimuth, to Kuhsán on the Hari Rud. The length of traverse was about 35 miles, and in this traverse will the resulting difference of longitude between the values brought up from India and Gore's value at Mashhad be dispersed. Apparently this is small (well within 15 seconds of arc), but its final determination will rest with the final revision of the triangulation. I may mention that the longitudinal values derived from Russian sources appear to be (as suggested by General Schindler) too far east, but the invariable absence of any exact description enabling one to identify the station of observation leaves the question entirely open. Mashhad is a large town, larger than Herat, and about as large as Kandahar. A geographical position simply described as "Mashhad" is of no practical value.

GEOGRAPHICAL NOTES.

Our New Session.—The Session of the Society for 1885–6 will commence on the 16th of November. The programme for the Evening Meetings up to Christmas is as follows:—November 16th, Opening Address by the President, The Marquis of Lorne; Paper by Mr. Holt S. Hallett on an ‘Exploration Survey for a Railway Connection between India, Siam, and China.’ November 30th, Paper by Mr. W. Montague Kerr on his ‘Journey overland from Cape Town, across the Zambesi to Lake Nyassa.’ December 14th, Paper by Colonel C. E. Stewart on the ‘Herat Valley and the Persian Border, from the Hari-Rud to Seistan.’

The Exhibition of Appliances in Geographical Education.—The exhibition of maps, atlases, reliefs, globes, and other apparatus used in geographical education, collected from the principal establishments and institutions in England and on the Continent, is being actively arranged. It is hoped that the Catalogue will be ready in time for the opening in the latter half of November.

Wissmann's Exploration of the Kassai.—From a detailed article in that most useful journal ‘Le Mouvement Géographique,’ we are able to give some account of the remarkable discoveries made by Lieut. Wissmann during his recent descent of the Kassai river. The article is written by M. Wauters, evidently from a full report received from Lieut. Wissmann. The lieutenant was accompanied by Lieut. Muller and Dr. Wolf as his chief subordinates, the expedition being undertaken at the instance of the Congo Association. It started from Malange on the Cuanza on July 17th, 1884, for the Cuango, the route thence to the Kassai being almost the same as that followed by Buchner, Schütt, and Pogge. The Kassai was crossed on October 18th, and three weeks later the expedition arrived at Lubuku, the residence of Mukenge. Here, on the banks of the Lulua, some distance above its confluence with the Kassai, a station, Luluaburg, was established. From this base Lieut. Wissmann sent one of his companions to reconnoitre eastwards and another northwards. Leaving a guard of soldiers along with thirty workmen at Luluaburg, the expedition began the descent of the Kassai on May 28th, 1885, in a steel boat, the *Paul Pogge*, ten large and ten small canoes. There were 200 persons in all composing the expedition. Near the mouth of the Lulua rapids were encountered, but from that point there was no obstruction to navigation. After it receives the Lulua the Kassai assumes the aspect of a great river, dotted everywhere with islands. The native name for it here is Sairé. The right bank is occupied by tribes of the Bakuba family, and the left bank by the Bashilelé. The expedition was very favourably received, the natives bringing ivory and caoutchouc for sale. The forests which cover both banks of the river are believed to abound in caoutchouc, and the country

is amply supplied with game. On June 6th the expedition passed on the right bank the mouth of what was believed to be the Sankuru, the lower course of the Lubilash, discovered by Wissmann and Pogge in 1881. On Stanley's last map it will be seen that the Sankuru is made to join the Lomame to form the Lubiranzi, which falls into the Congo some distance below Stanley Falls. The Sankuru joins the Kassai by two arms 830 and 1000 feet wide. Its course, according to native report, is nowhere obstructed by falls. Below the Sankuru the Kassai continues its course in a north-west direction, its breadth always increasing and reaching in places 3300 yards. The country is well peopled. On June 19th the expedition arrived among the Badinga, who received it in the most friendly way. On the 20th the mouth of a river some 45 yards wide was passed on the left bank, which Lieut. Wissmann believed to be the Loangue, which has hitherto been made to flow into the Congo. Its waters are of a reddish hue, and at its mouth it is known as the Temba. Lower down the Bangodi were as friendly as the Badinga. It was very different, however, with the Bakutu, among whom the expedition camped on June 24th. These treated the explorers in a most hostile manner, attacking the camp several times till taught by the rifles of the expedition to keep a respectful distance. The Bakutu have the reputation of being bellicose cannibals. At this part of its course the Kassai contracts much in breadth but increases proportionately in depth; the virgin forest disappears, and the banks are densely populated. There seems to be no trade in these parts, the only product met with being copper, everywhere copper. On July 1st, among the Badima, guns and some pieces of European goods were met with for the first time. On July 2nd, the river suddenly assumed colossal proportions, its breadth reaching sometimes over 10,000 yards, the depth being proportionally small and the course dotted with islands and sandbanks. On the left the Kassai is joined by the Cuango, and on the 4th the Mfini of Stanley, coming from Lake Leopold, contributed its waters on the right. Wissmann, like Stanley, found the river between the Cuango and the Mfini a series of lagoons and marshes, connected by a complicated network of channels, fringed by a wide and thick border of spiny shrubs. Below the Mfini the Kassai is known to the natives as the Kwa. The right bank, as Stanley tells us, is inhabited and cultivated, while the left bank touches on vast plains, the home of herds of elephants. The river itself here swarms with hippopotami. On July 9th, after a journey of forty-three days, the Congo was reached at the station of Kwamouth. Here the river is greatly contracted, its breadth being no more than 450 yards, the depth being considerable and the current rapid. The discovery of the course of the Kassai itself is of sufficient value to render this expedition of great importance; and if it is proved, as will very likely happen, that the great river is joined by the Sankuru and the Loangue as well as the Cuango, our notions of the hydrography of the region

will be greatly altered. The Kassai as a tributary of the Congo is second only to the Mobangi. Let us only recall that it was probably the beginning of the Kassai that Cameron passed in 1875, in $12^{\circ} 15' \text{ S. lat.}$, at the foot of the Messamba Mountains. Livingstone in 1854 encountered it under the name of Kassabi in $11^{\circ} 15' 47'' \text{ S.}$, about 330 feet wide. Ninety miles farther down near Degunda, Pogge found it in 1875, 800 feet wide and almost 12 feet deep. To the eighth parallel its course is almost due north. Lower down it receives from the left its first great affluents, the Ruembé, the Chibumbo, the Luachim, and the Chikapa, and its breadth at once greatly increases. At Kebassa, $6^{\circ} 37' \text{ S.}$, below the falls of Maimoumené, where Pogge and Wissmann crossed it, it attains a breadth of 330 yards. On his return from accompanying Wissmann to Tanganyika, Pogge explored the river to its junction with the Lulua, $5^{\circ} 5' \text{ S.}$ Lieut. Wissmann's report, M. Wauters states, is accompanied by a map in three sheets, prepared by Lieut. Von François, the geographer of the expedition. The following table of positions is taken from this map:—

	S. Lat.	E. Long. (Gr.)
Village of Katendé	6 15	22 55
„ Mona Tenda	6 17	23 37
Lubuku	6 1	22 48
Luluaburg	5 58	22 49
Rapids of Lulua	5 16	21 50
Confluence of Luebo (left bank)	5 25	21 35
„ Lulua	5 5	21 5
„ Sankuru (right bank)	4 20	20 25
„ Loangue (left bank)	4 25	20 5
Village of Gana-Damata (left bank)	4 5	19 45
Camp among Bakutu	3 45	19 20
„ „ Badima	3 17	18 7
Confluence of the Cuango (left bank)	3 15	17 50
„ „ Mfini (right bank)	3 0	17 35
Village of Muchizé	3 0	17 30
Kwamouth station	3 10	16 45

The Resources of Africa.—We have already, under the head of New Publications, referred to Dr. A. Fischer's very trenchant brochure, 'Mehr Licht im dunkeln Weltteil'; and it may be useful to give here briefly some of the conclusions which he comes to as to the resources of Africa and its suitability for white colonisation. Dr. Fischer refers to the vague statements made as to the riches of Africa, and deems it useful to bring these to the test of statistics. His paper refers chiefly to the east coast region, but also deals with the west coast to some extent. Dr. Fischer estimates the commercial domain of the Zanzibar region at over 400,000 square miles, and yet he points out that eight European firms (three of them German) undertake the whole business of that area, and that they are already complaining of over-competition. The total trade of Zanzibar amounts to 1,750,000*l.*, imports and

exports. English goods are much preferred by the natives, according to Dr. Fischer; "all good things come from England," they say. The total value of the produce of the Zanzibar region Dr. Fischer estimates at a million sterling. The leading products, caoutchouc, spices, copal, hides, copra, orchilla, sesame, &c., are obtained from a narrow strip of coast some 1100 miles long; the vast interior has nothing but ivory worth transporting to the coast. Caoutchouc is supplied in small quantities and inferior quality by East Africa, and is not to be found north of Mombassa. On the coast districts, according to Dr. Fischer, it is being rapidly exterminated by the unskilful and improvident way in which the juice is drained off. In the extensive but scantily wooded plateaus of Central Africa neither *Ficus elastica* nor *Landolphia* is found. Orchilla will soon be thrust aside by some chemical preparation. Coffee, cinnamon, nutmeg, indigo, cotton, grow sparsely in a few gardens, but not for export. In West Africa the case is hardly better. Its coast is to the east as 16 to 11, but its articles of export are not in proportion. Ivory is found in larger quantity, while the other articles mentioned above are also produced with no essential difference. Cotton, indigo, tobacco, and spices, usually described as products of the country, are of no commercial value. Since the competition with Australia, gum copal has so sunk in price as not to pay unless with slave labour. Coffee, however, of very good quality is produced as an article of commerce in Liberia. Coffee is also obtained from the wild plant in the Portuguese possessions. The total value of the exports of the West Coast Dr. Fischer gives at 2,450,000*l.* Whether caoutchouc is to be found in the West African interior has not yet been proved; the caravans returning from Stanley Falls to Zanzibar bring back only ivory. The elephant has been almost exterminated on all the coast district over a width of from 130 to 200 miles. In the greater part of South Africa the elephant is no longer to be found, while the great commercial territory of Egypt yields only 330,000 lbs. annually. According to Dr. Fischer, the total quantity of ivory exported from Africa amounts annually to 1,760,000 lbs., which involves the yearly sacrifice of 40,000 elephants. The best and proportionately the greatest quantity of ivory is supplied by Zanzibar—440,000 lbs. from an area of 400,000 square miles. The western region, of which the Congo territory alone comprises over a million square miles, yields only 550,000 lbs. Mozambique yields 220,000 lbs.; the Niger territory, 165,000 lbs.; Gaboon, Cameroons, and Lagos the same; Ambriz, Benguela, and Mossamedes, 220,000 lbs.; the Red Sea 110,000 lbs.; and the Cape region the same. Altogether the total yield of Africa in ivory Dr. Fischer estimates at 800,000*l.* annually in value. He is inclined to regard the ivory trade as the bane of Africa, diverting as it does all the energies of the natives and the Mahomedan traders from steady agricultural labour. As to what is to replace the ivory when it is exhausted, and give occupation to the natives and others engaged in

the trade, only the vaguest statements, Dr. Fischer maintains, can be obtained from travellers in the interior. The fertility of the soil and richness of the vegetation are talked of, but no definite data are produced. Dr. Fischer takes an equally desponding view of the suitability of the African soil for agriculture. The fertility of the "virgin soil" of Africa is not to be compared with that of South America and India; in Usagara and at Stanley Pool European vegetables cannot be got to grow without manure. At the same time, Dr. Fischer admits that the fertility of Africa varies greatly in different regions. The west is much more fertile than the east, owing to its greater moisture, and even in the interior of the West Coast Portuguese possessions the forests and vegetation are of exceptional richness. Of tobacco, he maintains, little can be made, and even coffee without slave labour could not be cultivated with profit. Of European grains wheat is the most promising for Africa, but none of them can be cultivated without the greatest and most constant care. Dr. Fischer scouts at the idea that Europeans will ever be able to colonise Africa. The resources of the continent can only be developed by native labour; and natives will not work without being compelled, and therefore, according to Dr. Fischer, slavery, or life service, as he puts it, is inevitable. There is much else in Dr. Fischer's book worthy of the serious attention of those interested in the development of Africa. His view is certainly pessimistic, and varies greatly from that of other travellers. Mr. Johnston, for example, found that on Kilimanjaro he could grow most European vegetables without manure and with the most abundant results. Statistics show that the trade of Africa has been growing steadily for years; and we must remember that our knowledge of the resources of the continent is still extremely scanty. Still it is well that the estimate of Dr. Fischer should be known.

The Austrian Congo Expedition.—The new number (9) of the 'Mitteilungen' of the Vienna Geographical Society contains several letters from Dr. Oscar Lenz, dated July and August last. They give his impressions of Liberia, Akkra, and the Cameroons. Dr. Lenz speaks very well of Akkra, with its broad clean streets. He expects that an exchange of territory is likely to take place between the Germans and French in their recently acquired possessions on the Gold Coast, since the former have annexed all the country lying behind the Lagoons at Grand and Little Popo, which can be of no use without the territory behind them. At Cameroons, Dr Lenz found that the factories, mission-houses, hulks, &c., lie several miles inland from the mouth of the river, and the journey up for large boats is a very difficult matter. The left bank of the Cameroons river is steep, 50 to 60 feet high. It consists of sandy clay, which sends out a narrow sandy beach, about ten feet above highwater mark, on which stand a number of factories, while the negro villages lie on the higher and more healthful plateau, where are also found the English mission buildings. Many Europeans still live on the

hulks in the river. There are as yet no special German Government buildings; the present Governor, Freiherr v. Sothen, lives in an old factory in Bell Town. The language at the Cameroons Dr. Lenz found to be universally English. Official notices are drawn up in English and German; English money is in general circulation. As in the Niger delta, palm oil and palm nuts are here the staple articles of trade; ivory and caoutchouc are seldom seen. Dr. Lenz heard that a German company intended to buy a large stretch of land on the slopes of the Cameroons Mountain for the purpose of plantations; the experiments in coffee-culture on the Wörmann farm at Gaboon are not encouraging for such enterprise. At Gaboon, Dr. Lenz found the French insisting on their own language being used by the Protestant missionaries, and imposing such heavy rates that the trade had dwindled down to very small proportions. Here he visited the Wörmann farm, on which for seven years a large sum of money had been spent in the attempt to carry on coffee-culture, but with absolutely no success. The whole native population in the Gaboon region is being rapidly driven towards the interior by the Fans, who are gradually overpowering all the coast region. After touching at Setté Kamma and Kabinda, Dr. Lenz left the latter place on August 13th for Banana.

Coal Beds in the Rovuma Region.—According to a communication made to the Paris Geographical Society on June 5th last, M. G. Angelvy, a French engineer, in the service of the Sultan of Zanzibar, has succeeded in discovering coal on the Lujenda tributary of the Rovuma river. His journey was made in the summer of last year. He ascended the Ukereja from Lendy, and found at 18 miles that that river had contracted to a mere ribbon of water. From the source of the river (which he found almost dry) M. Angelvy crossed the plain of the Yaos to the Rovuma. This plain is dotted with rocky heights which at Masasi reach an altitude of 2800 feet, and which to M. Angelvy seemed to be pierced with veins of copper. He collected several fragments of malachite, and observed what he considered signs of considerable veins of iron, which he also found to exist on the Rovuma. From above the confluence of the Rovuma and the Lujenda (which he gives as Rienda) M. Angelvy struck south to the latter river. Crossing to the right bank, he soon came upon what he believed to be an outcrop of coal, which he followed along the bank of the river for 38 miles to Chipoopoota, about 12° south, a little beyond the Makanje river. The coal is embedded in fine sandstone rock, and M. Angelvy made excavations at various points all along his route. Judging from the specimens which were taken from near the surface, M. Angelvy considers the coal to be of excellent quality; the great drawback being the distance of the bed from the coast, all the more to be regretted that in close proximity to the coal are beds of siderite. In descending the Rovuma from its confluence with the Lujenda, M. Angelvy found its mean breadth to be almost 2000 feet, and its depth from a foot to a foot

and a half, its course being everywhere obstructed by rocks. M. Angelvy states that the Sultan intends to work the coal-beds, and to construct either a road or a railway, to be ultimately prolonged to Lake Nyassa. Sir John Kirk, in transmitting M. Angelvy's account of his discovery to the Foreign Office, accompanies it by a letter which has been obligingly placed at our disposal. Sir John states his firm belief in the genuineness of M. Angelvy's discovery: he himself has been all along convinced of the existence of coal in the Rovuma region. The distance from the coast he considers to be the chief drawback at present, "but a time may come when a supply of fuel will be welcome at a part half-way to Lake Nyassa, on the shores of which we know that coal also exists, as it does on the Zambesi, both above and below the Kebrabassa Falls." The only immediate result, Sir John considers, will be to raise a question of inland frontier, for the districts in question lie not only south of the river Rovuma, but are situated 60 miles south of the latitude of Delgado Bay, on the coast between the dominions of the Sultan of Zanzibar and those of Portugal in Mozambique. Sir John adds that this southern region promises several mineralogical products of interest, for near Newala precious garnets and almandines of considerable value have been found by the missionaries; also beryl and aquamarine, which usually indicate the presence of other gems of higher value. By reference to the paper and map in 'Proceedings R.G.S.,' 1882, p. 65, it will be seen that M. Angelvy went over exactly the same ground as Mr. Joseph Thomson. The latter, it will be remembered, failed to find anything that could be regarded as coal. M. Angelvy does not state what tests he submitted his "coal" to. Sir John Kirk states that M. Angelvy's report as to the fairly good quality of the coal agrees with the report made on samples sent by him (Sir John) to India for examination; but judging from the context these seem to have been samples sent at some former time.

The Nyassa Region.—In a report to the Foreign Office, by Mr. Lawrence Goodrich, Acting Consul for the Nyassa District, date Bandawé, Lake Nyassa, June 1st, he describes a recent visit to the country on the west of the lake. He refers principally to the territory of Muazi, which was visited by Livingstone. During Mr. Goodrich's stay at Kasungo, Muazi's town, 130 miles S.S.W. of Bandawé, the chief died, and was succeeded by his nephew Katamé. Mr. Goodrich was well received here, the natives having that respect for the English which is always to be found where Livingstone has been the only previous white visitor. Mr. Goodrich's chief object was to inquire into and endeavour to wean the chiefs from encouraging the slave-trade. The country he passed through between Bandawé and Kasungo he found entirely uninhabited, though abounding in game of all kinds. Kasungo is situated in the centre of a large treeless plain, 2258 feet above the level of Lake Nyassa, the houses being built round a curious conical-shaped hill, 900 feet above the plain. The chiefs Mr. Goodrich interviewed were anxious to see English traders

settled in the country. Muazi's country is known as the Marumba country, and the people are Wanyasse. Here a very large stock of ivory is to be bought, according to Mr. Goodrich; Katamé offered to sell him a hundred tusks. The soil, he states, is good and adapted for wheat growing; cattle thrive admirably, and the tsetse fly does not exist in the district. The plain around the base of Mount Kasungu is 4000 feet above the sea, which altitude, in Mr. Goodrich's estimation, should insure a climate suited to Europeans. The natives appear to him to be simple and peace-loving.

Manchuria.—In his Consular Report on the trade of Newchang for 1884, Mr. Christopher Gardner gives, by direction of the late Sir H. Parkes, some account of Manchuria, which forms the Consular District of Newchang. The area of Manchuria Mr. Gardner gives as 300,000 square miles, and the population, according to the estimates of the Roman Catholic missionaries, as 15,000,000. It is now divided into three provinces, Heh-lung Kiang or Sagalien, Kirin, and Fêng-tieng. Mr. Gardner then enters into a detailed account of each province, its government, military force, divisions, and towns. The area of Heh-lung Kiang is 150,000 square miles; of Kirin, 95,000; of Fêng-Tieng, 55,000. The first-named is very sparsely peopled. The province of Kirin contains a mixed population of Manchus and Chinese in the west, of aboriginal tribes, such as Gilyaks, Koriaks, &c., east of the mountains and west of the Ussuri, together with a large community of Coreans, who were driven from their country by political causes since 1868. The population of Fêng-tieng is mostly Chinese, with a few communities of Manchus scattered about, and some 30,000 or so of Coreans in the north-east corner. Hundreds of thousands of immigrants have arrived in this province since 1876 from Shantung and Chihli, and besides increasing the population round the centres of trade, have broken up and cultivated land hitherto waste, especially north of the Palisades on the Mongolian frontier, and east of the Palisades and Usutao river, west of the Yaloo. This territory was, in 1865, a neutral belt, which neither Chinese nor Coreans were allowed to colonise. The port of Newchang is in this province, and up to the beginning of this century the ground on which the port stands was in the sea-bed. The town of Moukden, also in the province, Mr. Gardner describes as the finest and most prosperous of all the cities he has seen in the Chinese empire. It has a population of about 400,000. In an appendix, Mr. Gardner gives some interesting statistics and other information concerning Christian missions in Manchuria. He gives the number of Roman Christians as 12,530 in 1884. The number of Protestant Christians he does not know.

The Laos.—In a recent Consular Report from Siam (No. 1, 1885) Mr. Archer gives an account of his journey into the province of Kabin, which lies on the eastern side of the Siamese delta, at the foot of the

mountains separating the Meinam valley from the Mekong. Mr. Archer gives some very interesting notes on the little-known Laos. He says that the settlements in the provinces of Pachim and Nakon Nayok are, as it were, the south-western outposts of the Laos race, which forms the bulk of the population of Eastern and Northern Siam, but they are *phung kao*, or "white-bellied," and therefore distinct from the "black-bellied," or inhabitants of the Chieng-mai provinces. They are not, however, the original inhabitants of these provinces, but captives from Muang Kalassin, a province to the north-east of Korat, formerly dependent on Wien Chan, who, after the war waged successfully by the Siamese against that ancient kingdom about sixty years ago, were transported to, and allowed to settle in, the country extending from the province of Nakon Nayok to that of Battambang. This country consists for the most part of a series of slight and gradual elevations and depressions, the dwellings, gardens, and any other plantations being generally situated on the former, whilst rice is cultivated in the latter. The population is sparse, and consequently the greater part of the country is covered with jungle. The inhabitants are exceeding indolent, and appear unable to exert themselves to procure more than enough rice for their bare sustenance. Their mode of living is of the simplest description, and their country being far from any commercial centre and outside any trade route, hardly any foreign goods, with the exception of cotton, are to be found amongst them. All Laos tribes, however, are not characterised by such indolence. Those living in the provinces closer to Korat are much more active, and devote more attention to agriculture, especially to the rearing of silkworms. This is stated to be due to the latter having a poorer soil at a higher altitude, which compels the inhabitants to devote more attention to silk-producing as a means of livelihood.

The Geographical Society of Australasia.—We have received the first volume of the 'Proceedings' of this young Society, containing, among other things, reports of the meetings at which the Society was organised, and the rules on which it is constituted. The preliminary meeting was held in Sydney, on April 2nd, 1883, and the Society was constituted on May 31st following. In August the Victoria Branch was established at Melbourne. According to the constitution of the Society its objects are scientific, commercial, and educational. Under the first head, the Society will promote the advancement of geographical science generally, and more especially the completion of the geographical explorations of unknown and imperfectly known parts of Australasia, with a view to obtain information in reference to their physical features, fauna, flora, and geological formation. Commercial geography will be encouraged with a view to further the commercial progress of Australasia. The Society, under the head of education, will promote the knowledge of physical, commercial, and political geography, among all classes, by means of illustrated public lectures and various publications. The

Society has made a good beginning in the expedition to New Guinea, which it has promoted, and in the assistance given to Mr. Forbes, to which we have already referred. In this first volume is a paper by Mr. E. Marin La Meslée, the Honorary Secretary, on 'Past Explorations in New Guinea,' and a scheme for the scientific exploration of the island. Mr. J. F. Mann contributes Notes on the Aborigines of Australia; Mr. Alex. Morton, Notes of a trip to the islands of Torres Straits, and on the south-east coast of New Guinea. In the section devoted to the Victoria Branch there is the Address of the Vice-President Baron von Mueller, the celebrated botanist, who points out the utility of the Society, and the value of the study of geography generally. The papers read in this branch are on the 'Discovery, Physical Geography, and Resources of the Kimberley District, Western Australia,' by Mr. J. A. Panton, and on the 'Utility and Necessity of a Geographical Society,' by Mr. A. C. Macdonald. We have also received, in a separate form, the Annual Address, for Session 1884-5, of Sir Edward Strickland, Vice-President of the Society and President of the New South Wales Branch. Sir Edward reviews at considerable length the recent progress in geography and exploration. Altogether, the Society promises to do good work, and we hope it will receive substantial encouragement both from the Governments of the various Colonies, and from the population generally. We may say that the first volume contains a short letter from Mr. Lawrence Hargrave, accompanying a map of the Fly River, New Guinea, from notes of the exploration of that river by Mr. Hargrave.

Hudson's Bay.—The steamer *Alert* returned to Halifax on October 18th from Hudson's Bay with the observation party who have spent fifteen months there testing the practicability of that route for navigation from the Canadian North-east to Europe. We have already (*ante*, p. 462) referred to the arrangements for conducting their observations, and it would seem that they show the average temperature to be not so low as the average winter temperature in the North-west. The lowest monthly average was 30 degrees below zero. The ice observations show that Hudson Straits and Bay are navigable for properly built and equipped vessels for from three to four months, from July to October. The movements of the ice vary, and vessels have at all times to be cautious.

The Antarctic Committee of the British Association.—In our October number (p. 675) we gave an incomplete list of names of this Committee. The Committee as appointed is as follows:—Sir Joseph D. Hooker, Sir George Nares, Mr. John Murray, General J. T. Walker, Admiral Sir Leopold M'Clintock, Dr. W. B. Carpenter, Mr. Clements Markham, and Admiral Sir Erasmus Ommanney. The Committee is appointed for the purpose of drawing attention to the desirability of further research in the Antarctic Regions, nearly half a century having elapsed since the last exploration. Admiral Sir Erasmus Ommanney is the Secretary.

PROCEEDINGS OF THE GEOGRAPHICAL SECTION OF THE BRITISH ASSOCIATION.

ABERDEEN MEETING, 1885.

[Concluded from p. 692.]

Thursday, September 10th.

Brazil. By COLIN MACKENZIE.—The author gave a general account of the physical geography of Brazil, of its resources and inhabitants. He contrasted the vast area of the country and scant population, and stated that if peopled as densely as Europe it would hold three hundred million souls, instead of ten millions as at present.

The Indian Forest School. By Major F. BAILEY, R.E., Director of the School.—The author stated that it was only within the last twenty-five years that a special State Department has administered the Indian forests. The staff was at first composed of men who had received no professional education, but they were able to do all that was then needed, and accomplished work of great value. As a result of their work the State became possessed of large forest areas, from which a permanent supply of produce had to be secured, and which had therefore to be managed systematically. At this time nothing was known of systematic forestry in England or in India, and an arrangement was made in 1866 under which candidates for the Indian Forest Service were trained on the Continent. The arrangement then made with the French Government is still in force, but it has now been decided to undertake the instruction in England. Great progress has been made in Indian forestry, and this is mainly due to the professionally trained men with whom the Forest Department has been recruited; but up to 1869 nothing had been done towards the education of the subordinate ranks. As work requiring professional skill became necessary over large areas, it was found that the "divisions" must be broken up into a number of smaller executive charges under natives of the country, and that they must receive a professional education. In 1869 Mr. Brandis made proposals to organise the subordinate grades and to train men at the Civil Engineering Colleges, and several other attempts were made in the same direction, but without marked success. In 1878 he proposed to establish a Central Forest School, and his proposals were accepted by Government. The chief object of the school was then to prepare natives of India for the executive charge of forest ranges, and to qualify them for further promotion, but it was hoped that it might ultimately be used to train candidates for the controlling branch. The chief forest officers of provinces were to select candidates, and send them to be trained at the school, none but natives of India being admitted. A number of forests near Dehra Dun were grouped together as a training ground and placed under a separate conservator, who was also appointed director of the school; a board of inspection was also appointed. The first theoretical course was held in 1881, and courses have been held every year since then.

The present system is that the candidates, who must be in robust health, are selected by conservators of forests or by the director of the school. They must serve in the forests for at least twelve months before entering the school. Candidates for the ranger's certificate must have passed the entrance examination of an Indian University on the English side; candidates for the forester's certificate must have passed a lower examination. The course of training for these two classes extends over eighteen and twelve months respectively. Men who gain the certificates

return to their provinces, and are employed there. The course of instruction for the ranger's class embraces vegetable physiology, the elements of physics and chemistry, mathematics, road-making and building, surveying, silviculture, working plans, forest utilisation, forest botany, the elements of mineralogy and geology, forest law and the elements of forest etiology. The course for foresters is much more simple. The preparation of manuals is in progress, and a library, museum, chemical laboratory, observatory, and forest garden have been established.

The period of probation in the forest before entering into the school has a twofold object: firstly, to enable the theoretical course to be understood; secondly, to eliminate men who are unsuited to a forest life before time and money have been spent on their training. As a rule, the students are employés of the Forest Department, and they draw their salaries and maintain themselves while at the school, no instruction fees being charged. It would not at present be possible to get candidates whose maintenance and education are entirely paid for by their friends. Nine men who have left the school hold appointments from 125*l.* to 200*l.* a year, and this ought to draw eligible candidates. Conservators of forests say that the men trained at the school are markedly superior to their untrained comrades. The area of reserved forests has largely increased of late, and the prospects of the students are very good. During the session of 1884 there were forty-six students of all classes at the school, of whom eight were from Madras and seven from native States, the chiefs of which have been induced by the establishment of the school to take measures for the protection of their forests. The school has now been made an imperial institution, and this is a great advantage in every way. The expenses of the school in 1884 are said to have been 1911*l.*

The Indian Forest Survey. By Major F. BAILEY, R.E., Superintendent of Forest Surveys in India.—The author commenced by stating that it was only in comparatively recent times that measures have been undertaken to preserve what remained of the great Indian forests. The first thing to do was to demarcate the tracts which were to be reserved and to free them as far as possible from rights. The area now reserved is about 48,000 square miles or about 5½ per cent. of the total area of British India, not including the native states. The tracts demarcated owe their immunity from destruction either to the fact that they occupy ground which was, in the absence of communications, inaccessible, or which is much broken, or cannot be irrigated. They are situated either in the plains or on the low ranges of hills rising from them, or on the lower or middle slopes of the Himalayas up to an elevation of 8000 or 9000 feet above sea-level. Although they include within their boundaries considerable areas which have been wholly or partially denuded of trees, the ground is, generally speaking, more or less densely covered with trees and jungle.

In former years accurate forest maps were not required, but the present system of management renders good maps indispensable, and in 1872 measures were taken to provide them. The Imperial Survey Department could not conveniently undertake the work, and it was consequently thought desirable to organise a special branch of the Forest Department to act under the control of the Surveyor-General. This arrangement has worked most satisfactorily. The scale of the maps formed the subject of much discussion, but ultimately it was decided that the scale should usually be 4" = 1 mile for the most valuable forests, and 2" = 1 mile for those of less value. An establishment of surveyors was then raised and trained. The first work undertaken was the survey of the forests of Dehra Dun, area about 573 square miles, the private lands of the district being surveyed at the same time by the Imperial Survey Department, and a combined map of the whole country being thus produced. The next work was the survey of the Kumaon and Garhwál forests, area about 1400 square miles; and the survey of an area of about 1600 square miles in

Haiderabad is now in progress. Altogether since 1872 about 3000 square miles have been surveyed and mapped, mostly on the scale of 4" = 1 mile. It will of course take a long time to work over the whole of the forest property, but detailed maps of the entire area are not urgently needed at the present time, since for forests in which simple protection can alone be attempted small-scale maps or sketch-maps will suffice for some years to come.

When the survey party takes the field, the officer in charge has command of a considerable number of men with a large quantity of stores and equipment. He has to hire carts or camels, and march to the scene of the work. On arrival, each native surveyor is given a piece of work, four or five of them being grouped under one European surveyor, and a computing office is established in some central position. When sufficient work of this kind has been done, or when the season is too far advanced for it to be continued, the party moves back to headquarters. If such work is not well controlled it is sure to show this in inferior quality, insufficient quantity, or high cost. The procedure must be varied according to circumstances, and it has to be considered how a map that will answer the purpose can be produced in the shortest time and at the smallest cost. The ground worked over by the Forest Survey Department presents exceptional difficulties, of which the following are the principal: the surface is much broken up, the crop of trees and jungle is dense, the supply of drinking water is precarious and often of bad quality, the forests are infested with wild animals, food is difficult to obtain, and jungle fever is by no means uncommon. The wild animals are not at all appreciated by the unarmed native surveyors, and many cases have occurred in which they have caused the most serious inconvenience, stopping the survey of certain tracts for a long time. The experience gained of the natives of India in the Forest Survey Department has shown that almost anything can be made of them. The principle adopted has been to stimulate them to exertion and to promote a spirit of emulation among them; they were taught that accuracy was of more importance than rapidity, and encouraged to bring to notice all discrepancies in their work. At first only the most simple operations were entrusted to natives, but a few of them can now do excellent work of the most difficult kind. The combination of European and native labour has answered very well. Detailed surveys of wild and densely wooded ground have rarely been made before in India, and it is evident that they must be more expensive than similar surveys of open, cultivated country; but to provide them is a necessity and a distinct economy.

On the Progress of African Philology. By R. N. CUST, F.R.G.S., Hon. Sec. of the Royal Asiatic Society.—Taking Dr. Latham's paper on the subject, read at the meeting of the British Association at Oxford in 1847, as a starting-point, Mr. Cust showed how, during the last thirty-eight years, African philology, or linguistic geography, had extended to a marvellous degree, and, under the impetus given to the study of African languages by missionaries and travellers, new additions were being made every year to our knowledge.

On the Changes which have taken place in Tunis since the French Protectorate. By Lieut.-Col. R. L. PLAYFAIR, H.M. Consul-General for Algeria and Tunis.—The author did not attempt to give a history of the events which led to the treaty of the Kasr-es-Said, by which the Bey lost his independence, and the actual government of the country became vested in the French Resident-General. After a few remarks on the manner in which the French are in the habit of governing their colonies, and the disfavour in which the foreign element is held, he bore his willing testimony to the important work of civilisation and improvement which is now being carried on in Tunis.

He alluded to the fact that he had been the first foreigner to pass through the celebrated Khomair country, in 1876, when it was simply a blank space on the maps then existing, and when neither private travellers nor Beylical officials were permitted to cross the frontiers. He again visited this country last year, and traversed nearly the same ground, but on this occasion over admirably constructed carriage-roads, passing from the Algerian frontier to Ain-Draham, a military station in the centre of the Khomair mountains, and thence down to the valley of the Mejerda, through which now runs a railway from Suk-Ahras in Algeria to Tunis. He passed several important Roman cities, such as *Simittu Colonia*, at the famous quarries of Numidian marble, and *Bulla Regia*, near the station of Suk el Arba. He visited El-Baja on both occasions, and found it on the former a picturesque but fever-stricken town, and on the latter clean and healthy, with the old Byzantine citadel transformed and modern French barracks.

At Tunis itself good roads are being constructed and a modern French town is being built between the native city and the lake. But the picturesque Arab bazars, which are a never-ending source of delight to the traveller, are quite untouched. Land is being rapidly brought under cultivation, taxes are being reduced or abolished, and a very important measure of reform is about to be effected, based on the famous Torrens Act, by which real property will become as easily transferable as a bank share. This will be done without trouble or violence, and it will be optional for all owners of property either to adopt the new system or to retain the old one.

Friday, September 11th.

On Levelling Operations in India. By Major BAIRD.—Will be published in 'Supplementary Papers R.G.S.' Vol. I. Part 4.

Notes on the Physiography of Southern India. By Col. B. R. BRANFILL.—*Vide ante*, p. 719.

On Colonel R. B. Woodthorpe's Recent Trip from Upper Assam into the Kampti Country. By Col. H. H. GODWIN-AUSTEN.—Colonel Woodthorpe's recommendation to the Chief Commissioner of Assam to take up again the exploration of the mountainous country in Eastern Assam, and to penetrate if possible beyond the water-parting, having been acceded to by the Indian Government, survey operations were commenced last winter in the valley of the Dying, or upper waters of the Noa Dihing of the plain country. While engaged on this work, Colonel Woodthorpe, accompanied by Major MacGregor and Messrs. Ogle, Grant, and Latouche, reached the pass of Chanken (8300 feet) at the head of the valley, and it was then decided that an effort should be made to visit the Kampti villages on that branch of the Irawadi visited by Wilcox sixty years ago, and never attempted since. It was impossible that the whole party could go, so the three last named returned to finish the survey of the Dying valley, while Colonel Woodthorpe and Major MacGregor, who commanded the escort, went on alone. They travelled lightly, with only four sepoys and forty coolies, and in extremely inclement weather, after six days, reached the stockaded village of Langnú, and were well received. They then went on as far as the right bank of the Namlung river, a large tributary of the Irawadi, rising in the snowy range to the northward; it was here 80 yards wide, with long deep pools and rapids. Thence going on to Padao, they saw the chief rajah, Lukún, of the district, who came from his summer residence to meet them, and he was most friendly, and begged them to stay a month and see all the country. The approaching rainy season rendered this impossible, and they had to start back at once for the Assam side, only doing so just in time, the swollen rivers being far more difficult to cross than on the outward journey. The whole

expedition was well planned and carried out, and if the same tact and judgment can be shown in our future relations with these Kamptis, we shall soon know as much of the country on the head-waters of the Irawadi as we do now of the Garo, Khasi, and Naga Hills.

Only a very ordinary road is required, crossing some point on the Patkai range, to open up a future trade with these people from the Assam side. And to this may be added the knowledge of the geology, zoology, and botany of this most interesting region.

On the Complete Exploration of Lake Yamdok in Tibet.—By TRELAWNY SAUNDERS.

On Himalayan Snow Peaks. By Lieut.-Col. H. C. B. TANNER, s.c., Deputy-Superintendent, Survey of India.*—In the course of the surveys along the Darjiling and Nepal boundary made in 1883-84 Mr. Robert brought back the unlooked-for intelligence that to the north-east of Kinchinjinga, that is, on the shady side of peaks and ridges which are nowhere under 20,000 feet, there is not a single glacier. Masses of glacier-ice and *névé* skirt the lower slopes, but in none of the valleys does the ice flow away to any distance from the immediate foot of the mountains. As a rule, the whole of the enormous mass of snow which is deposited on the slopes of the Kinchinjinga group is either evaporated where it falls, or else is melted and carried off by the Lachen and other feeders of the Teesta, without having first passed into the state of glacier-ice. In fact, Kinchinjinga may be said to have no glaciers worthy of the name. Nor does Mount Everest appear to have glaciers of noteworthy size.

Kabru, one of the summits in what may appropriately be described as the Kinchinjinga group, appears as a straight-topped and uninteresting ridge of snow, as seen from Darjiling, but a telescope directed upon it from points in the Purnea district reveals the fact that the face of Kabru, presented towards Darjiling, is only one side of a huge snow-clad tableland, 24,000 feet in height, quite smooth at the top, with a very slight slope to the westward.

Passing to the subject of Mount Everest, Colonel Tanner states that its survey is carried on under the greatest disadvantages, as the jealousy of the Nepalese Government keeps Englishmen at a distance of 80 miles from it. Hooker probably never saw Mount Everest. Sandakphu, 35 miles from Darjeeling and still 90 miles distant from the mountain, commands the finest view of it that is anywhere obtainable from British territory. The outline of Everest is rather tame, though fairly sharp; and a long snowy slope rests on its north-east flank. Peaks of 22,000 feet and thereabouts encircle its southern base, and below them are seen many dark mountain-masses which are without snows. From due south, near the Kusi river in the Bhagalpur district, Everest is by no means a marked feature in the landscape, although from a near point of view its face is wild, and the cliff must be very lofty. In fact, from the south, Everest has all the appearance of a very moderate hill, not in the least imposing, and hardly picturesque. Though rising to a height of 29,002 feet, it only towers 12,000 feet above its fellows, and is thus relatively commonplace. It appears quite clear that the peak which the Tibetans look upon as the highest in their country is not Everest, but some other peak to the north or north-west of it. Perhaps it is identical with Peak T 45, to the north-west of Everest, which rises to a height of 27,000 feet. Native views as to the heights of

* Abridged from the "Extract from the Narrative Report of Lieut.-Col. Tanner; in charge Darjeeling and Nepal Boundary Surveys," in 'General Report on the operations of the Survey of India Department, 1883-4.' Calcutta, 1885. Appendix, p. xxviii.

mountains are not to be trusted, and until this region has been fully explored by Europeans it is futile to discuss the probability of the existence of mountains exceeding Everest in height.

Next to the Kinchinjinga, Peak No. XIII., or Makalu (27,990-feet), is the finest yet fixed in the Eastern Himalayas. It stands apart from the Everest group, and exposes a great mass of snow towards the Sandakphu ridge. It has a remarkable cup or hollow, which extends down its slope, and over the edge of which the telescope discovers masses of ice making their way. The upper half of the mountain is composed of light-coloured rock, and contrasts with the dark southern spur. Makalu, notwithstanding its height of 27,900 feet, only rises 9000 feet from top to base.

A comparison of the absolute height of some peaks above sea-level with the actual amount of their slopes exposed to view gives the following results:—

Name of Mountain.	Place of Observation.	Height above sea-level.	Amount of slope exposed.
Everest	Dewanangj	29,000	8,000
"	Sandakphu	"	12,000
K ² (Kashmir boundary) ..	Range between Gilgit and Gor, 16,000 feet.	28,278	—
Makalu (No. XIII.)	Purnea, 200 feet	27,800	8,000
"	Sandakphu, 12,000 feet ..	"	9,000
Nanga Parbat, or Deo Mir	Gor, 15–16,000 feet	26,600	23,000
Tirach Mir (Hindu Kush)	On road from Gilgit to Chitral, 8000 feet	25,400	17–18,000
Rakaposhi (Gilgit)	Chaprot (Gilgit), 13,000 feet	25,560	18,000
Kinchinjinga	Darjiling, 7000 feet	28,160	16,000
Mont Blanc	Range above Chamonix, 7000 feet.	15,781	11,500

Notes on Colonel Tanner's Report. By DOUGLAS W. FRESHFIELD, Sec. R.G.S. —All mountain-lovers (and in Europe at the present moment there are 35,000 members of Alpine Clubs) will follow with singular interest the Report of Colonel Tanner on the highest known peaks of the Himalaya. It is the first comparative estimate of the summits and scenery of the Eastern and Western Himalaya that has been laid before them—the most authoritative description of the sublime snows and precipices of Nanga Parbat.

The splendours of this comparatively recent discovery have evidently made the strongest impression on our enterprising surveyors; so strong that they are even led to speak disrespectfully of the reigning "monarch of mountains." Gaurisankar (I repudiate the name "Mount Everest," for reasons I will shortly give) is set down by Colonel Tanner as having "all the appearance of a very moderate hill, hardly imposing and not in the least picturesque," "rather tame than otherwise," "relatively only commonplace."

I am disposed to set up a plea against the acceptance of this as in any sense a final judgment of the picturesque aspect of that great mountain. It is desirable to show by familiar examples the character of the views on the strength of which Nanga Parbat is exalted and Gaurisankar brought low. The two views of Gaurisankar cited are nearly equivalent in distance to the views of Mont Blanc from the Côte d'Or between Macon and Dijon and from the Jura behind Neuchatel. The view of Nanga Parbat, on the other hand, is from a point somewhat less distant than is

Monte Generoso from Monte Rosa. No Alpine traveller would pay any attention to disparagement of Mont Blanc founded on so very distant an acquaintance with the mountain, or to a comparison of it with Monte Rosa founded on views entirely different in character.

I now pass on to a matter to which I attach some importance. It is, it is true, a matter of phraseology only, but it is one which if left unexplained may make this valuable report a source of error. An erroneous statement once planted in text-books takes years to eradicate, if it ever is finally eradicated.

I refer to the fourth paragraph of the report, in which it is stated, "Mr. Robert has brought back the unlooked-for intelligence that to the north-east of Kinchinjinga, that is on the shady side of peaks that vary from 23,000 to 28,000 feet, there is not a single glacier." That the glaciers on this flank of the mountain should be inferior to those on the slopes exposed to the full force of the moisture-bearing winds, is what might be expected. For, as Professor Heim puts it, "glaciation is primarily dependent on distribution of moisture." But that there should be "no glaciers worthy of the name" on Kinchinjinga would under all the local circumstances imply a suspension of the laws that govern the rest of the mountainous portions of the earth's surface.

The hasty reader must not be misled by hasty expressions. From what follows it is quite clear that Colonel Tanner does not like to call a glacier a glacier unless it fulfils conditions not required in Europe. He has for the moment restricted the term—to quote his own words—to the very small number of icestreams "which flow away to a distance from the immediate foot of the mountains." Judged by this standard, the Alps have no glaciers on their southern slopes, and very few anywhere. But of course this is not the accepted or the scientific sense of the word *glacier*. Wherever snow passes through the conditions of *névé*, and attains the structure of glacier ice, there is a glacier. All that Colonel Tanner means is that the glaciers of Sikkim are far from equalling in dimensions those of Gilgit.

As to the probability of there being higher mountains than Gaurisankar, I agree with Colonel Tanner that it is for the moment futile to attempt to carry the discussion further.

All that can profitably be done is to define the present position of the question. No observer competent to fix absolutely the elevation of the summits has seen the region to the north of Gaurisankar. Five people only, competent to report at all, have lately seen it, namely Pundit No. 9, Babu S.C.D., and Mr. Graham, with Herr Boss and Kaufmann. These five all agree that it contains mountains of enormous height, which the Babu says the natives believe, and the climbers say they believe, are higher than Gaurisankar. The value of the climbers' belief—their "idea resting purely on eyesight," Mr. Graham terms it—depends entirely on his capacity to recognise Gaurisankar. This he asserts, but the Survey officers generally deny.

These several beliefs of the climber and the natives may, no doubt, both prove erroneous; such impressions must be taken only for what they are worth, and pretensions "to fix absolutely" the peaks north of Gaurisankar should for the present be discountenanced.

But it must at the same time be acknowledged that two natives, one of them a man of large local experience, and the other a trained observer, have borne independent testimony to the existence of enormous mountains in the direction in which Mr. Graham and Herr Boss say they saw their unknown peaks, and that no witness, scientific or otherwise, in a position to contradict their idea from personal knowledge has as yet been brought forward.

Gaurisankar, I should add, has been frequently delineated. A chromo-lithograph with the title "Gaurisankar, or Mount Everest," from a drawing by one of the

Schlagintweits, has for years hung in the Alpine Club rooms. The 'Indian Alps' of a lady traveller published by Messrs. Longmans in 1876, contains a plate of the same peak from an original sketch. Its outline is again delineated on the margin of a map issued by the Survey Department, and in the hands of M. de Déchy and Mr. Graham. And an oil picture of the mountain, copied—if I recollect rightly—from a sketch by Colonel Tanner, was shown at the Royal Geographical Society last year by Mr. Graham.

With regard to the individual name which has been attached to the great Nepal peak, I hesitate to use it for the following reason.

The proper rule seems to be that where a characteristic local name exists it should be kept, and that what may be called personal or monumental nomenclature should be reserved for the nameless summits now frequently the subjects of algebraical arrangements. The attempt made in the Alps to substitute Dufour Spitze for Höchste Spitze for the loftiest crest of Monte Rosa has been far from popular or universally accepted, although General Dufour was a distinguished officer as well as the most esteemed of mountain map-makers. Any attempt to displace the names of the Jungfrau, the Finsteraarhorn, or the Matterhorn would have been certain of failure. The summits now known as the Agassizhorn, Studerhorn, and Pic Tyndall are minor and previously nameless crests. M. Reclus and the editor of *Petermann's 'Mitteilungen'* (1880, p. 489), followed by a large number of Continental geographers, adhere to the high-sounding Gaurisankar in place of "Mount Everest" or "Everest," and I propose to use any influence I may possess over the literature of orography in the same direction. Whatever the result in the individual instance, I cannot but hope that a resolute protest may check similar changes of names in the future and save any new mountain that may be discovered from being converted into a Mount Victoria or even a Mount Randolph Churchill.

Let me take this opportunity to lay humbly before the heads of the Indian Survey Department one or two practical suggestions with respect to the use of the material already at their disposal, or for its enlargement.

I. The Survey Office has already reproduced as a frontispiece to the Report of 1881-2 a drawing of the Sikkim range. Similar reproductions of the more important of the numerous mountain drawings—admirable drawings, I am assured by Mr. W. W. Graham—taken by Colonel Tanner, would be of great value.

II. A table of words used in the different districts of the Himalaya for natural features or common objects, might lead to interesting results.

III. Statistics should be accumulated, and a table, corrected and increased from time to time, be issued, showing for each district the height of the principal peaks and passes, the snow-level, and limits and length of glaciers (on both flanks), range of forests and vegetation, rainfall at different levels and different seasons. Five or six typical glaciers should be selected for study, and their advance or retreat from time to time recorded. A good foundation for work in this direction has been laid by the Stracheys and Godwin-Austen, Hooker and Drew: but there is room for any amount of energy in its continuation.

The imperfection of the material at hand need not be made a reason for withholding the prompt issue of a tentative table of the character proposed. The very imperfect tables relating to the Alps, published a quarter of a century ago, were of great use as stimulants to inquiry. One point, for example, on which more light should be thrown is the extraordinary difference in the snow-level in Gilgit and Ladâk. According to Colonel Tanner, in the former country a watershed of 15,500 feet feeds considerable glaciers; * in the latter, according to Mr. Drew, passes over

* Report of 1879-80.

19,000 feet are in summer snowless. And yet Ladâk contains the largest glaciers of Central Asia! The latitude is practically the same. Probably while the snowfall in Gilgit is far heavier, the great depth of the valleys in the immediate proximity of the loftiest peaks prevents any proportionate extension of the glaciers.

Monday, September 14th.

Projected Restoration of the Reian Mœris, and the Province, Lake, and Canals ascribed to the Patriarch Joseph. By COPE WHITEHOUSE, M.A.—The Berlin Geographical Society has published, in its 'Zeitschrift' for May 1885 (No. 116), the latest map of Egypt, from the Fayoum to Behnesa, and from the Nile to the Little Oasis. The text by Dr. Ascherson gives credit for a considerable area to the topographical observations presented to the Geographical Section last year at Montreal. So much of the Reian basin as lies between the Qasr Qerûn and the Qasr Reian has not been visited by any European except the author of this paper (1882, 1883). It is now an accepted fact that there is a depression south of the Fayoum, not less than 150 feet below the level of the Mediterranean, with a superficial area at the level of high Nile of several hundred square miles. It is irregular in shape, curving like a horn from a point near Behnesa to the ridge which separates it from the Fayoum. In the southern part are two, and perhaps three, patches of vegetation, wild palm-trees, and ruins of Roman and early Christian date. This part was visited by Belzoni, May 22nd, 1819; Calliaud, November 24th, 1819; Pacho and Müller, 1823-4; Sir G. Wilkinson, 1825; Mason Bey, 1870; and Ascherson, March 27th, 1876. Dr. Ascherson determined by aneroid observations that his camp was 29 metres below the sea. Calliaud found ruins about + 38 m., or about the level of high Nile in the valley on the same latitude. The aneroid, theodolite, and other observations of March 6th and April 4th, 1882, and April 1883, by the author of this paper, established a depth of — 175 to — 180 English feet. The greatest depth is probably under the western cliffs south of the Haram Medhûret el-Berl. No previous explorer had conceived it possible that this might have been a lake within historic times. The level of the ruins, as determined by Calliaud, shows that the ancient station of Ptolemais might have been, as represented in the text and maps of Claudius Ptolemy, on a horn-shaped lake about 35 miles long and 15 wide, with a maximum depth of 300 feet, fed by a canal, partly subterranean, from Behnesa, as well as by a branch of the present Bahr Jûsuf communicating with it through the Fayoum. The lower plain of the Fayoum had been, at that time, fully redeemed, and the present Lake of the Horn reduced to such insignificant dimensions as to be unnoticed. The restoration of the Reian basin of Lake Mœris and the drainage by evaporation of the Birket el-Qerûn would be a repetition in modern times of the best results reached in the Greco-Roman period, perhaps 3000 years after the first effort to utilise these two unique basins for storage and drainage.

The feasibility of the scheme is partly based upon the Mahommedan traditions in regard to the original redemption of the Fayoum, the construction of the existing canals, and the reservoir of water which formerly filled the Wadi Reian. It had been stated by Sir G. Wilkinson that the Bahr Jûsuf, or Canal of Joseph, owed its name to a restoration under Saladin (ca. A.D. 1166). Masûdi (born, Bagdad, A.D. 885; died, Cairo, A.D. 956) gives in chapter xxi. one of the very numerous forms of the tales in which the principal engineering works of Middle Egypt are assigned to the patriarch Joseph. Joseph also seems to be the Souphis of the Greeks.

It is a question for consideration whether the descriptions of Goshen and the region occupied outside of Goshen proper, and known as the land of Raamses, apply to this part of Middle Egypt. In a posthumous treatise of great critical value,

Jablonski of Frankfort (1693-1767) asserted that in Egypt from all time men have been of opinion that the Israelites dwelt in the present provinces of Beni-Suef and el-Fayoum. Important finds of papyri, and the publication by the Dutch Academy of Sciences of a geographical papyrus of Mœris (ca. B.C. 1000, exhibited), its towns and canals, and the labyrinth, have stimulated the imagination of the archæologist and the historian to a high pitch. The representation of a stately array of cities with emblazoned arms, of fish, aquatic birds, and pasturages for cattle on the western shore, further serves to justify the peculiar admiration expressed for this region by Greek and Roman travellers, as well as by the Semitic historians. The Ionians, Sicilians, and Romans willingly conceded that its public works, in three categories, transcended in splendour and in usefulness the most stupendous efforts elsewhere extant. Their origin was virtually unknown. They were apparently not Egyptian. The Hyk-Sos, or Lords of ta-She, seem to have been Phœnicians, who seized upon the strategic advantages of the Fayoum and (in the words of the Nubian geographer, applied to a somewhat similar work in Arabia), made this reservoir not only for the use of the inhabitants, but to keep the indigenous population in greater awe by being masters of the water. Like the Moors in Southern Spain, their works gradually deteriorated in alien hands, and are now, after 4000 years, at their lowest point. The work of restoration is comparatively easy. The following advantages would result:—First, the lake and morass, now increasing, in the Fayoum would be diminished, and a large amount of land redeemed; second, the danger of an excessive rise of the Nile would be averted, and the labour of taking precautions against it saved; third, a considerable amount of abandoned land, now desert, would be irrigated; fourth, an immense reservoir would deliver water at a high level for navigation as well as irrigation, and even power; fifth, Lakes Menzaleh, Bourlos, Edkou, and Mareotis could be reclaimed, and those parts of the Delta would then again resemble the shores of Holland and the mouths of the Rhine.

Report of the Committee for furthering the Scientific Examination of the country in the vicinity of Mount Roraima.

Mount Roraima. By EVERARD IM THURN.

Report of the Committee appointed for the purpose of promoting the Survey of Palestine.

The Cadastral Survey of India. By Lieut.-Col. W. BARRON.—Will be published in 'Supplementary Papers R.G.S.,' Vol. I. Part 4.

The Ordnance Survey of Cyprus. By TRELAWNY SAUNDERS.

The Rivers of the Punjab. By General R. MACLAGAN. Vide *ante*, p. 705.

On a Clinometer to use with a Plane-table. By Major HILL.—Will be published in 'Supplementary Papers R.G.S.,' Vol. I. Part 4.

On a supposed Periodicity of the Cyclones of the Indian Ocean south of the Equator. By CHARLES MELDRUM.

The Portuguese Possessions in West Africa. By H. H. JOHNSTON.—Published in the 'Scottish Geographical Magazine,' October 1885.

North-West Australia: the Results of Recent Explorations, and the Scope of the Country for Commercial Development. By J. G. BARTHOLOMEW.

Tuesday, September 15th.

Antarctic Discovery. By Admiral Sir ERASMUS OMMANNEY, C.B., F.R.S., &c.—The object of this paper was to draw attention to the neglect of the Antarctic region as a field for exploration. The author gave a summary of the work which had

already been done by Cook, Bellingshausen, Weddell, Biscoe, Balleny, Wilkes, Dumont D'Urville, James Ross, and Nares (in the *Challenger*). He referred to a paper by Dr. Neumayer on the subject, the substance of which was reproduced in 'Nature,' vol. vii., and concluded as follows:—"I have thus laid before you but a very imperfect description of these voyages; to give the details of the scientific results would occupy a separate paper. But I have endeavoured to demonstrate how large a field remains open for discovery. I think, from all we now know, we may infer that the South Pole is capped by an eternal glacier; and, from the nature of the soundings obtained by Ross, it would appear that the great ice-wall along which the ships navigated was the termination of the glacier—the source from which the inexhaustible supply of icebergs and ice-islands are launched into the Southern Ocean, many of which drift to the low latitude of 42° . The fact of finding volcanoes of equal proportions to Etna or Mont Blanc creates a zest for further research regarding that awful region on which neither man nor quadruped ever existed. No man has ever wintered in the antarctic zone. The great desideratum now before us requires that an expedition should pass a winter there, in order to compare the conditions and phenomena with our arctic knowledge. The observations and data to be collected there throughout one year could not fail to produce matter of the deepest importance to all branches of science. I believe that such an achievement can be accomplished in these days with ships properly designed and fitted with the means of steam propulsion; nor is it chimerical to conceive a sledge party travelling over the glacier of Victoria Land towards the South Pole, after the example of Nordenskiöld in Greenland. Another interesting matter requires investigation, from the fact that all the thermometers supplied for deep-sea temperatures to Ross were faulty in construction, as they were then not adapted to register accurately beneath the weighty oceanic pressure. Moreover, another magnetic survey is most desirable, in order to determine what secular change has been made in the elements of terrestrial magnetism after an interval of forty years and more, when taken by Ross. In fact, there exists a wide field open for investigation in the unknown South Polar Sea. This paper will, I trust, be the prelude for others to follow in arousing geographers and this powerful Association in promoting further research by despatching another South Polar expedition, having for its object to secure a wintering station. No other nation is so capable of providing and carrying it out. Even in the Australian colonies there exists the spirit and the means for such a noble enterprise."

Geographical Education. By J. SCOTT KELTIE.

This was a brief summary of the author's Report to the Council of the Royal Geographical Society on the results of his mission of inquiry into the state of geographical education, at home and abroad. The paper has been published in the 'Scottish Geographical Magazine,' October 1885. A discussion ensued on its reading, in concluding which General Walker, President of the Section, made the following observations:—

"I think that all persons interested in the diffusion of geographical science among the educated classes in this country must feel grateful to the Royal Geographical Society for having taken the initiative in endeavouring to impress on our universities and public schools the essential importance of a sound geographical education, and also for having appointed Mr. Keltie to report on the state of such education abroad, on finding that its direct efforts to influence the authorities who preside over our seats of learning at home were of no avail. Mr. Keltie has shown in his excellent report that the claims of geography to occupy a central place in education have been recognised at all the principal schools and universities on the Continent. Thus we see that a considerable majority of those who are entrusted with the higher education of the youth of Europe hold geography in great respect as

a means of training the intellect and imparting valuable knowledge, while in this country geography is always held in little respect and is often quite ignored. This neglect is strange and unaccountable, for there is no science of which a knowledge is so necessary for the right understanding of many other sciences as geography; it is many-sided and has many aspects, physical, naturalistic, mathematical, topographical, historical, political, military, and commercial; it teaches a knowledge of man's dwelling-place, and this knowledge is a very important element in determining how man is influenced by his surroundings, and how, in the endeavour to turn them to his own advantage, he has "governed nature by obeying her laws." The very plasticity of the subject, and the difficulty of grasping it firmly without injury to the fairness of proportion of its several parts—unduly expanding some and compressing others—has doubtless been one of the causes of its having been so much shunned in this country. But the principal cause is that its importance as a means of intellectual training and of storing the mind of the youth with knowledge which will be serviceable to the man in after life has not been as fully recognised here as on the Continent. Our great mathematicians, for instance, seem to think it too simple to afford a sufficient training for the intellectual powers; but if only fairly tried it will be found capable of being taught so as to give the student an interest in higher mathematics than he might otherwise have attained unto; it may lead him over wide fields in the regions of geometry of three dimensions, which he might not otherwise have cared to enter; and this is something for a man, even though it lands him some distance short of geometry of more than three dimensions, in which doubtless the intellectual powers are more severely exercised.

"But geography has hitherto been so taught in this country as to justify the accusation that it does not afford a sufficient means of intellectual training; the teaching has been confined, at best, to such descriptions of localities as may be found in gazetteers, and these have been presented in such a manner as to be acquired only by cram, with more of harm than of good to the student. No wonder that under such circumstances the introduction of geography into the school curriculum should be regarded with horror, and that the excuse offered for its exclusion is that it is pushed out by the pressure of more important subjects. But if taught in a more reasonable manner, as in the German universities, it may be made of great value as a means of education, linking together all the branches of knowledge with which it is associated, and so fixing the stores of learning acquired in early youth in the chambers of the mind that any additions to them that may be made in after life may tend not to bury, or kill, or eliminate what has been previously acquired, but to consolidate, and enrich, and render it more capable of fructification. For this purpose a profusion of minute details, such as are needed by the professional geologist, or naturalist, or topographer, is not required, for they would tend rather to crowd each other out than to make a firmly established and symmetrical whole; broad facts only are all that is wanted. Thus as the question, What is scientific geography? is often nowadays put to those who advocate improved methods of geographical teaching in this country, I would answer that it is the science of those broad facts of the earth's surface, as the abode of life, by which the social and political conditions of mankind are sensibly influenced. This science is worth cultivating by men of education everywhere; Englishmen, with their vast commercial enterprises and territorial acquisitions in all parts of the globe, can of all men least afford to neglect it, and we may well hope that at no very distant date it will be rightly appreciated and firmly established in our public schools and in our universities."

On the Best and Safest Route by which to attain a High Northern Latitude. By JOHN RAE, M.D., LL.D., F.R.S.—The plan proposed is that the route

by the west shore of Spitzbergen should be taken by one, or perhaps two, steamers similar to the fine vessels used in sealing and whaling at the present time. That after forcing the ice "pack" at the north-west end of Spitzbergen, a north-east course towards Franz-Josef Land should be followed. That a depôt of coals should be placed at a convenient harbour in North Spitzbergen. Extracts are given from Parry's 'Narrative,' 1827, pp. 101 and 148, showing how open and small the ice was in lat. $82^{\circ} 45'$ N. The southern drift of the ice that so obstructed the advance of Parry's boats will be no great impediment to a powerful steamer, whilst if she gets helplessly fixed in the pack she will drift homewards with it. No well-equipped and powerful steamer has tried this route.

Oceanic Islands and Shoals. By J. Y. BUCHANAN.

On the Depth of the Permanently Frozen Soil in British North America. By General Sir J. H. LEBROY, C.B., K.C.M.G., F.R.S.—The title of this short paper suggests the subject rather than the contents of it. For there are few questions in physical geography on which less is accurately known than the limits of that circumpolar region within which soil permanently frozen is to be found all the year round. This appears to be true both in Siberia and in Arctic, or Sub-Arctic America. Professor E. K. von Baer communicated to the Royal Geographical Society in 1838 all the observations in Siberia then known to him,* and defining as "perpetual ground-ice" that layer of earth which is immediately below that which is thawed by the summer heat, he insisted on the importance for physical geography of ascertaining its thickness in all countries of which the mean temperature is considerably below the freezing-point. But the facts were few; nor have they accumulated much since. The subject can only be investigated where there is a considerable depth of alluvial soil, and as frozen earth is nearly as hard to quarry as rock, we cannot be surprised that few residents in frozen countries have been found to incur the expense of sinking pits or wells for the express object of determining its thickness. To one of these, however, we owe the discovery that near the Siberian pole of lowest temperature the subsoil is frozen to a depth of 382 feet. I mean the Russian merchant Schargin, formerly of Yakutsk,† who, instigated and encouraged by Admiral Wrangel, about fifty years since, persevered in an attempt to sink a well until he was rewarded by getting through the ground-ice at the great depth above stated.

The late Sir John Richardson followed von Baer in 1839 with a paper drawn up for distribution among the officers of the Hudson's Bay Company,‡ calling their attention to the inquiry; but being in that country in 1844, I could not learn that any steps had been taken to pursue it. He himself, however, in Appendix II. to his 'Narrative of an Arctic Searching Voyage' (1851) gives three or four illustrations. The conditions at the present time are much more favourable than they then were. The country is traversed in every direction by geological and other explorers, surveyors, and engineers. Many parts of it are settled by a resident population. Wells must have been sunk at a multitude of points. There seems nothing wanting except a more general interest in the subject, and perhaps a greater willingness to acknowledge the facts. The cooling of the surface soil by the action of frost in a lower stratum appears to be a provision to counteract the intense heating power of the sun in the summer months in the northern parts of both continents, and to

* Journal R.G.S., vol. viii.

† Lat. 62° N., long. $129^{\circ} 40'$ E., annual mean temperature 14° Fahr.

‡ Journal R.G.S., vol. ix. p. 117. See also the 'Edinburgh New Philosophical Journal,' 1841.

secure a supply of moisture to the roots of cereals when they most require it; so much so that I believe that agricultural experience in the Canadian North-west would be in favour of retaining it even if it were possible to get rid of it; nevertheless I have observed a disinclination to allow that in any particular district there is frozen soil, under a mistaken idea that it indicates a climate of great severity.

My attention was first drawn to this subject by precisely such an incident as Sir John Richardson had in view when he wrote in 1839, "Even in the higher latitudes, such as on the Mackenzie river, much information may be gained by visiting some of the recent landslips which occur annually on the banks of the larger rivers." Such a landslip had very recently occurred, when I descended that noble river in June 1844, in lat. about $64^{\circ} 20'$ and long. $124^{\circ} 15' W$. It had left a perpendicular cliff of 180 feet, which was frozen to a depth of 45 feet from the surface, the limit being distinctly marked by a change of colour, and by the trickling out of water along the lower edge.* This is the greatest thickness of ground-ice as yet actually measured in America. Placing the American pole of lowest temperature in $60^{\circ} N$. and $100^{\circ} W$., or thereabouts, the locality is 700 miles distant from it, and it should be compared, not with Yakutsk, which is only 120 miles from the Siberian pole of lowest temperature,† but with some place at a corresponding distance to the west of the latter point, which will be found about the frontier of the province of Irkutsk. There is good reason to believe, however, that within the Arctic circle in America a thickness of ground-ice is attained much exceeding that at Yakutsk. Lieut. P. H. Ray, U.S.A., to whom I am indebted for the information, sunk a pit at his station of International circumpolar observation near Point Barrow, in 1883, to a depth of 38 feet. At 28 feet from the surface the temperature of the soil was 12° Fahr., which appeared constant; it was the same at 38 feet. The ratio of increase of temperature per unit of depth, given by thirty-six mining shafts and wells in the United States, is $+1^{\circ}$ Fahr. for 64 feet; this ratio may very possibly not exactly apply in such abnormal conditions, but it differs very little from the ratio found in the Kingswood collieries near Bristol,‡ viz. 1° Fahr. in 67 feet, and applying it provisionally Lieut. Ray obtains a total thickness of about 1300 feet (396 metres).

At York Factory on Hudson's Bay, in October 1835, the soil was found frozen to a depth of nearly 20 feet (19 feet 10 inches), of which the summer-thaw had only penetrated 28 inches (Richardson).

Dr. James Hector, on 5th March, 1858, found the soil at Fort Edmonton, on the Saskatchewan, at an elevation of about 2400 feet above the sea, frozen to a depth of 7 feet 6 inches.§ At this season there was, of course, no superficial thaw, but the frost had scarcely reached its greatest depth. The lowest temperature of the year at a depth of 6.4 feet is attained at Greenwich in February, at 12.8 feet in April, and at 25.6 feet in June.

I was credibly assured by a visitor to the famous Bell Farm, near Indian Head,|| that it had been found frozen there in the summer of 1884 at a depth of $12\frac{1}{2}$ feet.

Another intelligent witness assured me that he had seen it frozen in the month of July, eight feet below the surface, in the course of some drainage works that were being executed for the Corporation of the City of Winnipeg. On the other hand, I

* 'Diary of a Magnetic Survey,' 1883, p. 161.

† About Werchojanak, in lat. $67^{\circ} 34'$, long. $133^{\circ} 51'$.

‡ Report British Association, 1879, p. 43.

§ Lat. $53^{\circ} 31'$, long. $113^{\circ} 30' W$. See Journal R.G.S., vol. xxx. p. 277. The elevation is taken from the C. P. R. Section 1876.

|| Lat. about $50^{\circ} 30'$, long. $103^{\circ} 30' W$.

am told by the learned Director of the Geological Survey of Canada, Dr. A. Selwyn, that he has failed to obtain any really reliable or definite information on this subject, and has negative evidence that the soil is not permanently frozen in the neighbourhood of Brandon, or in the valley of the river Pembina, in latitude 50°, which is, therefore, beyond the limits.

We may suppose that towards the margin of the great region of permanent ground-ice there is one of intermittent frost, where in some years the summer thaw penetrates the winter frost, and in other years does not, the effect will depend also upon the exposure, the nature of the soil, the height above the sea, and other variable conditions: but these considerations only prove the necessity for investigation, and I bring it before this Section in hope that a fresh impulse may be given to the inquiry, which seems not unworthy even of international concert.

The depth to which the summer thaw reaches and its rate of progress, is a branch of the same subject, and one much easier to pursue. Franklin found it 22 inches at Great Bear Lake; it was said to be only 14 inches at Fort Norman, on Mackenzie's river; whereas at Fort Simpson, in 61° 51' N., on the same river, it was found thawed to a depth of 11 feet, in October 1837, below which was six feet of ground-ice (Richardson). The fort is situated on an island of alluvial soil, which may in part account for the depth of the thaw. A similar condition was reported to me at the Hudson's Bay fort on Lake à la Crosse, which is situated at the extremity of a peninsula.* Pits had been dug to a depth of 25 feet in 1837 without meeting with frozen soil, so also at what was then called Hodgson's Fort, Green Lake, and the trader in charge assured me that having had occasion in the winter of 1841 to dig a grave, he found that the frost had only penetrated to a depth of three feet. In each of these cases it would appear that the permanent vicinity of a large body of unfrozen water keeps up the temperature of the soil. The depth of thaw is obviously more dependent on the season and on the exposure than that of the frozen soil, and must greatly influence the agricultural capabilities of the place. It could be ascertained easily over a very large area of cultivation in the north-western provinces of the Dominion of Canada, by intelligent residents devoting a little time to the inquiry, in each of the months of open navigation.

On Recent Explorations in New Guinea. By COUTTS TROTTER.—Published in the 'Scottish Geographical Magazine,' October 1885.

Wednesday, September 16th.

Journeyings in South-Western China. By ALEXANDER HOSIE.—In the autumn of 1881 Mr. Hosie was appointed Her Majesty's Agent in Western China, and reached Ch'ung-ch'ing, in the province of Ssü-ch'uan, in January 1882. From this point he made three journeys in South-western China. In the spring of 1882 he proceeded through Southern Ssü-ch'uan and Northern Kuei-chou, the Chinese "Switzerland," to Kuei-yang Fu, the capital of the latter province, whence he journeyed westward in the footsteps of Margary to the capital of Yünnan. From Yünnan Fu he struck north-east through Northern Yünnan, following for days here and there the routes of Garnier and the Grosvenor Mission. At last he descended the Nan-kuang river and reached the right bank of the Great River, the local name of the Upper Yangtze, at a point below Hsü-chou Fu, an important city at the junction of the Min river and the Chin-sha Chiang, or River of Golden Sand. Here he took boat and descended the Great River to Ch'ung-ch'ing, his starting-point.

* Lat. 55° 27', long. 107° 54' W.

In February 1883, Mr. Hosie again left Ch'ung-ch'ing, and proceeded north-west to Ch'êng-tu, the capital of the province of Ssü-ch'uan, by way of the brine and petroleum wells of Tzû-liu-ching. From Ch'êng-tu he journeyed west and south-west through the country of the Lolos, skirting the western boundary of Independent Lolodom. From Ning-yüan, locally called Chien-ch'ang, and lying in a valley, famous, among other things, as the habitat of the white-wax insect, he passed south-west through the mountainous Cain-du of Marco Polo, inhabited in great part by Mantzû tribes, and struck the left bank of the Chin-sha Chiang two months after leaving Ch'ung-ch'ing. From this point Ta-li Fu, in Western Yünnan, was easily reached. From Ta-li Fu Mr. Hosie journeyed eastward to Yünnan Fu, which he had visited the year before, and then struck north-east through Western Kuei-chou to the Yung-ning river, which he descended to the Great River. Lu Chou, an important city at the junction of this river with the T'o river, was soon reached, and the Great River was again descended to Ch'ung-ch'ing. This journey occupied four months.

In June 1884 Mr. Hosie again left Ch'ung-ch'ing, and from Ho Chou, a three days' journey to the north of that city, he struck westward through a beautifully cultivated and fertile country to Chia-ting Fu, on the right bank of the Min at its junction with the T'ung river. Chia-ting is famous as the great centre of sericulture in Ssü-ch'uan, and as the chief insect wax producing country in the Empire. A day's journey west of Chia-ting is the famous Mount O-mei, rising 11,100 feet above the level of the sea. This mountain, which is sacred to the worship of Buddha, Mr. Hosie ascended in company with crowds of pilgrims. He then proceeded south, skirting the eastern boundary of Independent Lolodom, to the River of Golden Sand, the left bank of which was struck at the town of Man-i-ssü, between forty and fifty miles above P'ing-shan Hsien—the highest point reached by the Upper Yangtze Expedition in 1861. From Man-i-ssü Mr. Hosie descended the Chin-sha Chiang and the Great River to Ch'ung-ch'ing.

Notes on the large Southern Tributaries of the Rio Solimões. By Professor TRAILL.

On the Geographical Features of the Beauvy. By T. W. WALLACE.

What has been done for the geography of Scotland, and what remains to be done. By H. A. WEBSTER.—Published in the 'Scottish Geographical Magazine,' October 1885.

On Batho-hypsometrical Maps. By E. G. RAVENSTEIN.

NEW GEOGRAPHICAL PUBLICATIONS.

(By J. SCOTT KELTIE, *Librarian R.G.S.*)

EUROPE.

Böhm [Dr.] August.—Die Alten Gletscher der Enns und Steyr. Wien, Alfred Hölder, 1885: pp. iv. and 182.

This is a separate reprint of a paper from the 'Jahrbuch' of the K. K. Geol. Reichsanstalt (pp. 449–610). After a few introductory remarks, Dr. Böhm deals with the orography of the glacial traces in the region of the Northern Alps east of the Salzach, and to the investigations of previous observers. In the second chapter he describes the glacial phenomena of the Ennsthal, and in the third chapter similar phenomena in the region of the Steyr. The fourth chapter deals with accumulation and erosion, the fifth with glacial remains in the valleys of the Enns and Steyr, the sixth with diluvial breccia, the seventh with cirques and lakes, and the eighth with glacial erosion. There are sections of the ridges of the northern limestone Alps from the Salzach to the Enns, and a sketch map of the river system of the Enns and Steyr.

Poestion, J. C.—Island, das Land und seine Beiwohner nach den neuesten Quellen. Mit einer Karte. Wien, Brockhausen & Bräuer, 8vo., pp. viii. and 460. Price 10s. (*Grevel.*)

This is a systematic and complete account of Iceland in its various geographical bearings, and seems to us a conscientious and useful compilation, up to the latest date. In successive chapters the author deals with the position, dimensions, and physiognomy of the island, the surrounding ocean, climate, atmospheric phenomena, the coast, the islands, orography, glaciers, volcanoes, lava-fields, hot and mineral springs, rivers and lakes, rocks and minerals, flora and fauna, ethnography, industries, topography. The map is on the scale of 1:1,450,000.

ASIA.

China.—Journal of the North-China Branch of the Royal Asiatic Society. New Series. Vol. xviii.; Vol. xix. part i.; Vol. xx. Nos. 1 and 2. Shanghai and Hong-kong, Kelly & Walsh; London, Trübner, 1884–5.

Beginning with the present year, this very useful Society's Journal will be issued in short instalments at brief intervals, instead of as formerly in annual instalments. Vol. xviii. for 1883 contains a number of papers of considerable value. Dr. Joseph Edkins writes on 'What did the Chinese know of the Ancient Greeks and Romans?'; Mr. Charles Gould translates some extracts from Mr. F. Scherzer's French translation of the *Chao-hsien-chih*, an account in Chinese of Korean Geography and Customs, written in the fifteenth or sixteenth century. Other papers are Researches into the Geology of Formosa, by G. H. J. Kleinwächter; Fragments d'un voyage dans l'intérieur de la Chine, by C. Imbault-Huart; Some Notes on a Trip to Corea in July and August 1883, by G. James Morrison; Notes on some Dikes at the Mouth of the Nankow Pass, by H. B. Guppy; Notes on the Sze-Chuen and the Yangtze Valley, by A. J. Little. In part i. of vol. xix. we have—Animal, Mineral, and Vegetable Products of the Ichang Consular District, by C. T. Gardner; Journeys in Chêkiang, in Fukien, and from Foochow to Wênchow through Central Fukien, by E. H. Parker; Trade-routes to Western China, by Alex. Hosie. No. 1 of vol. xx. is entirely occupied by the Hung Lou Mêng, commonly called the Dream of the Red Chamber, by Herbert A. Giles. The greater part of No. 2 is occupied with the report of a long discussion on the extent to which infanticide is prevalent in China. In addition to a Memoir of the late Sir Harry Parkes, the remainder of the number is devoted to notes and queries on subjects of interest.

India.—Memoirs of the Geological Survey of India. Vol. xxi. part 3, pp. 113 (137–249). The Southern Coal-fields of the Rewah Gondwana Basin. By

Theodore W. H. Hughes, A.B.S.M., F.G.S.—Part IV. The Volcanoes of Barren Island and Narcondam, in the Bay of Bengal; their Topography by Captain J. R. Hobday, s.c., and Geology by F. R. Mallet, pp. 36 (251-286). Calcutta, Geological Survey; London, Trübner, 1885.

The area described in Mr. Hughes's memoir forms a portion of the great central basin of Góndwána rocks, occupying a large part of the country drained by the Són and some of its southern leading tributaries, and principally comprised within the limits of the Rewah State. The physical aspect of the country (80° 45' E. to 82° 55' E.) is very barren, but its most prominent characteristic is its hilliness. Mr. Hughes briefly sketches the physical geography of the district, its highlands, rivers, vegetation, climate, inhabitants. Much of the memoir is devoted to the identification and distribution of rocks, while a chapter is given to economic minerals. In and around the neighbourhood of the village of Umaria Mr. Hughes calculates that there is, at an average depth of 500 feet, a bed of coal 20 feet thick, over an area of four square miles, giving a total quantity of 80 million tons. The coal seems to be of fairly good quality. Mr. Hughes gives a warning concerning village sites. In many instances the present hamlets are at some distance from the positions indicated in the maps. This is due to the migratory and shifting habits of the Gónd and Baiga tribes, who, from one cause or another, rarely remain stationary for more than six or seven years. There is a map of the southern coal-fields of the Rewah-Góndwána Basin (four miles to an inch), two plates, and five special maps and sections.

Mr. Mallet's memoir contains the most complete and satisfactory account of the two very interesting little volcanic islands with which it deals. In February 1884 Mr. Mallet and Captain Hobday visited the islands, and while the latter mapped them, the former investigated their geology, which is interesting. The results are described at length in the memoir, and embodied in three maps (4 inches = 1 mile) (two of Barren Island and one of Narcondam); a view of the central cove of Barren Island, and sections across it. Barren Island lies approximately in N. lat. 12° 15', E. long. 93° 50'; and Narcondam in N. lat. 13° 26', E. long. 94° 15'. Mr. Mallet calls attention to the fact that although Prof. V. Ball, as well as Dr. Liebig and the Rev. Charles Parish (Proc. R.G.S., 1862, p. 216), calls attention to the erroneous idea that the sea surrounds the inner cove in Barren Island, the misconception has been repeated in text-books of geology published within the last few years. In Barren Island the volcanic action is reduced to the solfatara condition, while the Narcondam volcano has been long extinct.

M'Crimdle, J. W. [M.A., M.R.A.S.].—Ancient India as described by Ptolemy; being a translation of the chapters which describe India and Central and Eastern Asia in the treatise on Geography written by Klaudios Ptolemaeus, the celebrated Astronomer, with Introduction, Commentary, Map of India according to Ptolemy, and a very copious Index. Calcutta, Thacker, Spink, & Co.; London, Trübner, 1885: 8vo., pp. xii. and 373. Price Rs. 4.

This forms the fourth volume of Mr. M'Crimdle's series of works on Ancient India as described by the classical authors. The first of them was on Ancient India as described by Megasthenes and Arrian; the second on the Commerce and Navigation of the Erythræan Sea; and the third on Ancient India as described by Ktésias the Knidian. In the present volume Mr. M'Crimdle, in an introductory chapter, gives a succinct account of the general nature of Ptolemy's geographical system. This is followed by a translation of several chapters of Ptolemy's First Book, which serve to exhibit his general mode of procedure in dealing with questions of geography, and at the same time convey his views of the configuration of the coasts of India, both on this side the Ganges and beyond. To each detachment of the text Mr. M'Crimdle has subjoined a Commentary, the main object of which is first to show, as far as has been ascertained, how each place named by Ptolemy in his Indian Tables has been identified; second, to trace the origin or etymology of each name, as far as it is possible to

do so; and third, to notice very concisely the most prominent facts in the ancient history of the places of importance mentioned. Mr. McCrindle has carried out his plan with much care and scholarliness. The whole series will be of real service to all students of the geography of ancient India.

Desgodins, C. H.—*Le Thibet, d'après la correspondance des Missionnaires.* 2^{me} édition. Paris, Librairie Catholique de l'œuvre de St. Paul, 1885: 8vo, pp. 475.

This is a considerably enlarged edition of the work published by M. Desgodins in 1872, and which embraced the work of the missionaries to Tibet from 1855 to 1870. In the present volume the author goes back to the efforts of missionaries previous to the journeys of his brother the, Abbé Desgodins, mainly those of Renon, in his attempt to enter Tibet by Batang, and of Rabin, Krich, and Bernard, by Assam. The sections relating to the Abbé Desgodins have been somewhat compressed, and the chapters generally rearranged. The attempts of Prejevalsky and Széchenyi to enter the forbidden land have a chapter devoted to them, while the general chapters on the religion, administration, geography, commerce, literature, and industries of Tibet have been revised. Considerable additions have also been made to the Appendix, including a list of books on Tibet (not very complete) and a chronological list of missionaries to Tibet during the last three centuries (1624–1884). A much better map has also been added than that in the original edition.

AFRICA.

Brun-Renaud, Ch. Le.—*Les Possessions Françaises de l'Afrique Occidentale.* Paris, Baudoin et Cie., 1884: 8vo., pp. xviii. and 340. Price 3fr. 50 c.

In the introduction to this volume the author speaks of the recent development of colonisation in general, and of the aspirations of France in particular. About one-half of the work is devoted to Senegal—the history of its conquest; its physical geography; orography and hydrography; climate and meteorology; races and language; social organisation; the provinces; fauna and flora; agriculture, industry, commerce; missions and explorations; government and administration. Two chapters are devoted to the establishments on the Guinea Coast; four to the Gaboon; two to the Ogowé and the journeys of M. de Brazza. In three chapters are given an account of the International African Association, the Berlin Conference, and the Congo. In an appendix is a useful summary of facts as to the German Colonies. There are small maps (1) of the Senegambian Possessions, extending east to Segou, and (2) of the French Possessions on the Coast of Guinea, the Gaboon, the Ogowé, and the Congo.

AMERICA.

Krause, [Dr.] Aurel.—*Die Tlinket-Indianer. Ergebnisse einer Reise nach der Nordwestküste von America und der Beringstrasse, ausgeführt im Auftrage der Bremer Geographischen Gesellschaft in den Jahren 1880–81, durch die Doctoren Arthur und Aurel Krause.* Mit 1 Karte, 4 Tafeln und 32 Illustrationen. Jena, Hermann Costenoble, 1885: 8vo., pp. xvi. and 420.

It will be remembered that the brothers Krause spent a considerable time in the Behring Strait region in 1880–81, at the expense mainly of the enterprising Bremen Geographical Society. A whole year was spent among the Tlinket Indians who inhabit the country in the south-east of Alaska, and the results are given in this instructive volume. After a few pages given to the details of the journey, Dr. Krause devotes a chapter to an historical sketch of exploration in these regions, and to the condition of Alaska under the Russian and under the United States dominion. In the second chapter a description of the home of the Tlinkets is given, its geography, climate, animal and plant life. In Chapter iii. the people themselves are dealt with; the United States census of 1880 gave their number at only 6763. In succeeding chapters we have interesting and well arranged details as to the villages, houses and inhabitants, domestic life, fishing, hunting and trade, art and industry, usages at birth,

education, marriages, death; customs in peace and war; Tlinket myths, of which curious examples are given, "Jelchs," the raven, being the hero of most of them; Shamanism; the neighbouring tribes; missions and civilisation; language. Appended is a long list of the authorities which Dr. Krause has consulted to supplement his own observations, and a very full index. The many woodcuts are really illustrative of the text and are beautifully executed. The ethnographical map of South-east Alaska is on the scale of 1:2,265,000.

Sinclair, A. C., and Fyfe, Laurence R.—Jamaica. The Handbook of Jamaica for 1885–86. Published by authority. London, Stanford, 1885: 8vo., pp. [10] and 521.

In this new issue of this useful Handbook the statistics and other information are brought up to date, and a paper has been contributed by Mr. G. E. Hoskinson, late United States Consul to Jamaica, on 'Jamaica as a Winter Residence for Northern People.' The value of the Handbook would be increased by the addition of a good large-scale map.

Vining, Edward P.—An Inglorious Columbus; or, Evidence that Hwui Shān and a party of Buddhist monks from Afghanistan discovered America in the fifth century A.D. New York, D. Appleton & Co., 1885: pp. xxiii. and 788, 8vo., map and illustrations. Price 21s.

The celebrated Oriental scholar de Guignes was the first to find among the Chinese records, in the works of Ma T'wan-lin, which had never been investigated before by any European student, an account of a Buddhist priest, who, in the year 499 A.D., came to China and stated that he had been for forty years in a land which was twenty thousand *li*, or Chinese miles, to the east of the great Han country, or Kamtchatka, and also east of China. The country was called Fu-sang, because a species of tree called *fu-sang* was its chief production. M. de Guignes published his discovery of this account about 130 years ago, and but little attention seems to have been paid to the subject until the year 1831, when the Prussian scholar M. J. Klaproth published an article in which he attempted to show that Fu-sang simply meant Japan. This article was one of "assertion and presumption," but for some reason, which it seems difficult to explain, it appears to have been generally accepted as a settlement of the question. It was answered, however, by the Chevalier de Paravey, in 1844–46, in two pamphlets, and the next to discuss the subject was Professor Karl Friedrich Neumann, who published an able paper containing many new arguments in the 'Zeitschrift für Allgemeine Erdkunde,' vol. xvi. of the new series. Since that time, articles upon the subject have followed each other so thick and fast that "it is difficult to give a complete list of them." In 1875 Mr. Charles G. Leland published what was in fact the first book on the subject, entitled 'Fu-sang; or the Discovery of America by Chinese Buddhist Priests in the Fifth Century.' Mr. Leland adduced much new and valuable evidence as to the true location of Fu-sang, and his criticism of the chief opponents of Hwui Shān is short, but sharp. Many other able writers have from time to time published their views on the subject, and so the strife has gone on, much after the manner of the Zeno controversy, until it has formed a real curiosity of literature. It has at last culminated in 'An Inglorious Columbus,' a work as curious in many respects as the controversy to which it belongs. It is a formidable book even in size, and in order to write it the author is said to have devoted years to the study of Chinese and Aztec. His object is "to show that the land visited by Hwui Shān was Mexico, and that his account, in nearly all its details, as to the route, the direction, the distance, the plants of the country, the people, their manners, customs, &c., is true of Mexico, and of no other country in the world; such a multitude of singular facts being named, that it is inconceivable that such a story could have been told in any other way than as the result of an actual visit to that country." He gives translations of all that is known to have been written in French or German upon the subject, and a full statement of substantially all that has been written about it in English, with the exception, of course, of Mr. Leland's book. The original Chinese account is also given,

with copies of the several translations that have been made up to the present time, and a new translation by the author himself; and each statement is carefully examined in connection with the histories of Mexico and other parts of America, to determine whether such coincidences are to be found as to lead to a reasonable presumption that the account may be true. An immense amount of valuable and interesting information has thus been collected, and the book is not only clearly and concisely written, but is characterised by great moderation and ingenuity. Altogether Mr. Vining seems to make out a strong case in support of his views. He fully admits that some doubtful points remain to be elucidated, but he argues that those who attempt to discredit the whole of Hwui Shān's narrative because he describes a few marvellous things, might on the same grounds reject all the statements of Herodotus, Marco Polo, and Sir John Mandeville. He points out that Hwui Shān had to tell his story in a language with which he was but slightly acquainted, and urges with much plausibility that it is only fair to make allowance for errors in the transmission of the text, and for the changes which have taken place during the lapse of nearly fourteen centuries. And whatever Sinologists may think of the Fu-sang narrative itself, the theory that the Chinese first discovered America is greatly strengthened by the simple fact that during the past century a Japanese or Chinese vessel has been cast by storms, on an average, once in every three years and six months on the western American coasts. The book is illustrated by thirty-one engravings, and a map showing the route supposed to have been followed by Hwui Shān; and while even the most general readers will find it highly interesting, it will probably be accepted, at least for a long time to come, as the standard work on this much disputed and abstruse subject.—[G. T. T.]

GENERAL.

Agassiz, Elizabeth Cary.—Louis Agassiz, *His Life and Correspondence*. London, Macmillan & Co., 1885: 2 vols. 8vo., pp. xi. and 793. Price 18s.

There have been several special memoirs of the great Swiss-American naturalist published in the 'Proceedings' of learned societies and in scientific journals; but only now, from the hands of Mrs. Agassiz, have we a complete and detailed account of his career. Mrs. Agassiz leaves the story of a busy and supremely useful life to be told mainly in the letters of her husband and his friends. Here we meet with the names and the familiar correspondence of most of the great naturalists (in the widest sense) of the first half of the century—Cuvier, Humboldt, Lyell, Murchison, Sedgwick, Buckland, Hugh Miller, Sir Philip Egerton, and, later, Darwin. From the birth of Louis Agassiz, in the village of Motier, on the Lake of Morat, in 1807, to his death at Cambridge, in the United States, in 1873, "the most popular man in America," we are able in these pages to follow every stage in his career. From the age of twenty-one, when his memoir on Fresh-water Fishes made him acquainted with Cuvier and laid the foundation of his reputation as a naturalist, his activity never ceased till death. Agassiz did many services to geography direct and indirect. Apart from all controversy as to details, there can be no doubt that his long and patient researches on the Alpine glaciers led materially to a thorough comprehension of the character and effects of these phenomena, and to the adoption by geologists of a great ice-period for Europe at least. True, the enthusiasm and keen-sightedness of Agassiz may have led him to see evidences of ancient ice-action (as in the Amazon valley) where no such evidence can possibly be proved to exist; but this does not detract from the solid value of his recognised work. Agassiz's most direct contribution to geography was no doubt the narrative of his famous Amazon journey, and the scientific results obtained by himself and his companions. Another scarcely less important contribution to geography was his 'Lake Superior, its Physical Character, Vegetation, and Animals' (1850), embodying the results of the journey he made to that region with his students. And that is how Agassiz liked to teach geography, and in his earlier years at Neuchâtel actually did so. At Neuchâtel, Mrs. Agassiz tells us, "Agassiz collected about him by invitation a small audience of friends and neighbours, to whom he lectured. . . . The instruction was of the most

primitive and informal character, and was continued in later years for his own children and the children of his friends. In the latter case the subjects were chiefly geology and geography in connection with botany, and in favourable weather the lessons were usually given in the open air. One can easily imagine what joy it must have been to a party of little playmates, boys and girls, to be taken out for long walks in the country over the hills about Neuchâtel, and especially to Chaumont, the mountain which rises behind it, and there to have their lessons, for which the facts and scenes about them furnished subjects for illustration, combined with pleasant rambles. From some high ground affording a wide panoramic view Agassiz would explain to them the formation of lakes, islands, rivers, springs, watersheds, hills, and valleys. He always insisted that physical geography could be better taught to children in the vicinity of their own homes than by books or maps or even globes. Nor did he think a varied landscape essential to such instruction. Undulations of the ground, some contrast of hill and plain, some sheet of water with the streams that feed it, some ridge of rocky soil acting as a watershed, may be found everywhere, and the relation of facts shown perhaps as well on a small as on a large scale." This indeed was *Heimatskunde* in its best form, invented by Agassiz for himself; and his admirable method we commend to all who wish to make geographical teaching what it ought to be, one of the most attractive, healthy, and variedly instructive subjects in the whole field of education.

Marcel, Gabriel.—Documents pour l'Histoire des Colonies Françaises. 1. Une Lettre Inédite de Lescarbot, avec une notice bibliographique sur l'Auteur. 8vo., pp. 7. 2. Le Surintendant Fouquet Vice-roi d'Amérique. pp. 16. Paris, Delagrave, 1885.

These are reprinted from the 'Revue Géographique.' M. Marcel has obtained the documents, which he ably edits, from the Archives of the French Minister of Foreign Affairs, which contain a perfect mine of information concerning the early colonisation of America. Lescarbot, an *avocat*, born about 1570, took part in the expedition of Poutrincourt to the coast of Acadie, and his letter is dated from "Port Royal de l'Equille (Annapolis) en la Nouvelle France," August 22, 1606. It gives some details of Poutrincourt's attempt to found a colony at Port Royal. Fouquet, the subject of the second pamphlet, acted in a sort of irregular way as Viceroy of the French Dominions in America for some time in the middle of the seventeenth century. M. Marcel gives details of the events of his viceroyship, especially his attempts at forming establishments in Newfoundland, St. Lucia, and Martinique.

— Cartographie de la Nouvelle France. Supplément à l'ouvrage de M. Harrisse. Paris, Maisonneuve Frères et Ch. Leclerc, 1885: 8vo., pp. 41.

M. Harrisse's Bibliography was published in 1872. M. Marcel's Supplement contains an additional 114 entries of maps, published and unpublished, relating to the old French dominions in North America.

The following works have also been added to the library:—

[**America, United States.**]—Department of the Interior. United States Geological Survey. J. W. Powell, Director. Monographs of the United States Geological Survey. Vol. VIII. Paleontology of the Eureka District. By Charles Doolittle Walcott. Washington, Government Printing Office, 1884: 4to., plates, pp. 298.

The contents of this volume are as follows:—Letter of transmittal to Mr. Arnold Hague, by the Author. Letter of transmittal to the Director, by Mr. Arnold Hague. Preface. Summary of results. Fossils of the Cambrian. Observations on *Olenellus Howelli*. Fossils of the Lower Silurian. Fossils of the Devonian. Fossils of the Carboniferous. Systematic list of species. Paleozoic section in Central Nevada. Index.

Baddeley, M. J. B., and Ward, C. S.—Thorough Guide Series. North Wales. (Part I.) Chester, Rhyl, Llandudno, Bangor, Llanrwst, Bettws-y-Coed, Carnarvon, Llanberis, Beddgelert, and Ffestiniog Sections. London, Dulau & Co., 1884: 12mo., maps and plans, pp. xxiv. and 218. Price 3s. 6d.

— and —. Ditto. North Wales. (Part II.) Llangollen, Bala, Dolgelly, Barmouth, Oswestry, Shrewsbury, Welshpool, Llanidloes, Machynlleth, and Aberystwith Sections. London, Dulau & Co., 1885: 12mo., maps and plan, pp. xvi. and 147. Price 3s.

— . Ditto. Scotland. (Part I.) Edinburgh, Glasgow, and the Highlands as far north as Aberdeen, Inverness, Gairloch, and Stornoway, with a full description of the various Approaches and Chief Places of Interest in the Lowlands. London, Dulau & Co., 1885: 12mo., maps and plans, pp. xxxiv. and 297. Price 7s.

A modified and improved edition of the book previously issued under the name of 'The Highlands of Scotland.'

Baedeker, K.—Belgium and Holland. Handbook for Travellers. Eighth edition. Leipsic, Karl Baedeker; London, Dulau & Co., 1885: 12mo., maps and plans, pp. lxii. and 342. Price 6s.

This edition has been carefully revised and remodelled from the most recent time-tables, catalogues, Government statistics, and other sources. It contains 12 maps and 20 plans.

— Norway and Sweden. Ditto. Third edition. Leipsic, Karl Baedeker. London, Dulau & Co., 1885: 12mo., maps and plans, pp. lxxx., 427, and 42. Price 9s.

Based, as with previous handbooks, on the editor's personal acquaintance with the country described. It is illustrated by 21 maps and 11 plans.

[**Brazil.**]—Estatística do Commercio marítimo do Brazil do exercício de 1872–1873. 2ª Parte. Commercio marítimo geral, Importação e Exportação. Organizada pela Comissão dirigida pelo Dr. Sebastião Ferreira Soares. Vol. II.—Ditto. 3ª Parte. Commercio de longo curso por provincias. Organizada, etc. Vol. III.—Ditto. 4ª Parte. Commercio de cabotagem por provincias. Generos nacionaes. Organizada, etc. Vol. V. Rio de Janeiro, Typographia nacional, 1882–1884, 8vo., pp. (vol. ii.) 349, (vol. iii.) 597, (vol. v.) 459.

Leclercq, Jules.—Les Geysers de la Terre des Merveilles. Bruxelles, Typographie V° Ch. Vanderauwera, 1885: 8vo., pp. 30.

Orueta y Duarte, Domingo de.—Informe sobre los Terremotos ocurridos en el Sud de España en Diciembre de 1884 y Enero de 1885. Málaga, Tip. y Lit. de Fausto Muñoz, 1885: sm. folio, map and photographs, pp. 52.

Woods, [Rev.] Julian E. Tenison.—A History of the Discovery and Exploration of Australia; or, an account of the progress of Geographical Discovery in that continent, from the earliest period to the present day. 2 vols. London, Sampson Low & Co.; Melbourne, H. T. Dwight, 1865: 8vo., map and chart, pp. (vol. i.) xvi. and 449, (vol. ii.) xii. and 520.

NEW MAPS.

(By J. COLES, *Map Curator R.G.S.*)

WORLD.

World.—Neueste Karte der Erde, in Mercator's Projection, von Th. Bromme und C. F. Baur. Mit Rücksicht auf das Bedürfniss des Handelsstandes, sowie für den Unterricht an Lehranstalten. Stuttgart, Maier. 4 sheets. Price 6s. (*Dulau.*)

EUROPE.

Central-Europa.—Neue Uebersichtskarte von —, resp. der oesterreichisch-ungarischen Monarchie. Scale 1:750,000 or 10·3 geographical miles to an inch. Militär geograph. Institute, Wien. Sheets:—Westl. A. 3. Genf, Lyon, Belfort, Macon. Westl. A. 4. Turin, Marseille, Avignon, Antibes. Westl. A. 5. Toulon. E. 4. Hermannstadt, Kronstadt, Bukarest, Craiova, Vidin, Ruschuk. Price 2s. each sheet. (*Dulau.*)

Danmark.—Generalstabens topographiske Karte von —. Scale 1:40,000 or 1·8 inches to a geographical mile. Kalchographeret og graveret ved Generalstabens, Kjöbenhavn, 1884. Sheets:—Grenaa, Nimtofte, Essenbæk, Randers, Viborg. (*Dulau.*)

England.—Railway Map of the East of —, by John Airey, and certified by the Companies, 1885. Published by J. Airey, London. 2 sheets. Price 4s. 6d. (*G. Philip & Son.*)

Edinburgh.—Bartholomew's Large-scale Ordnance Plan of —. Scale 1:3168 or 23·11 inches to a geographical mile. Reduced from the Ordnance Survey plan on scale of 5 feet to a mile, and specially revised to the present date. Sheet No. 8, (Central sheet). J. Bartholomew, Edinburgh. Price 2s. 6d. coloured; and 3s. 6d. mounted on cloth.

This is the first published sheet of a large scale map of Edinburgh, which Mr. Bartholomew is at present preparing, and is a reduction from the Ordnance Survey, on the scale of five feet to the mile. The present is the central sheet, No. 8, and embraces all the most important public buildings and details of public interest in the city. It is printed in four colours; all public buildings are coloured dark drab, and thus catch the eye at once, public gardens and recreation grounds green, railway stations pink, and all other blocks of buildings light drab. In the vicinity of Salisbury Crags the elevations are indicated by a system of contour lines, which mark every change of 25 feet up to 575 feet. Great care appears to have been taken in the preparation of this sheet, and a comparison with the Ordnance Survey shows it to be a very accurate reduction; it also contains some corrections which are not shown on other maps of Edinburgh, and the scale is a very useful one.

Europa.—General-Karte von —, in 9 Bättern, entworfen und bearbeitet von H. Kiepert. Scale 1:4,000,000 or 55·5 geographical miles to an inch. Dietrich Reimer, Berlin, 1885. Revision von Richard Kiepert. (*Dulau.*)

This is a fine map of Europe, in which all the political divisions, and physical features are very plainly shown. An Ethnographical map of Europe is given on a smaller scale, together with a table containing the principal divisions of each country. Though called a map of Europe, it is in fact something more, as the southern portion contains excellent maps of Algeria, Tunis, and Asia Minor, and the eastern sheets, a portion of Western Asia. All means of communication, both by land and sea, are clearly laid down, and the number of hours occupied in the principal voyages are shown in figures. The map, as a whole, is a remarkably fine specimen of cartography.

London.—Philips' Redistribution Map of —, showing all the New Boroughs, with the number of their Representatives, according to the Redistribution of Seats Act 1885; Statistics of Population in 1871 and 1881, Acreage, and Inhabited Houses in each Borough. Scale 1:31,680 or 2·3 inches to a geographical mile. G. Philip & Son, London and Liverpool. Price in cloth case, 3s.; mounted on cloth and in case, 6s.

This map is a reduction from the Ordnance Survey; it is printed in four colours, and is very clearly drawn. At present it is published on one sheet only, but a larger map, on the scale of 15 inches to the mile, is in course of preparation. A distinctive feature in this map is the great clearness with which all public buildings, parks, railway stations, &c., can be seen at a glance, and this is entirely owing to a judicious system of colouring.

— Large-scale Ordnance Survey Plan of the City of —, by John Bartholomew, F.R.G.S., specially revised to the present date. Scale 1:5280 or 13·9 inches to a geographical mile. G. Philip & Son, London and Liverpool. Price 2s. 6d. coloured; and 3s. 6d. mounted on cloth.

Mittel-Europa's.—Eisenbahn- und Weltzeitkarte —, von Emil Plechawski. Official der k. k. pr. galiz. Carl Ludwig-Bahn. Equatorial scale 1:2,782,688 or 38·1 geographical miles to an inch. Artaria & Co., Vienna. 4 sheets. Price 12s. (G. Philip & Son.)

This map shows all the railways of Central Europe corrected to date, and gives the correction to be applied to local time, in order to reduce it to the universal railway time which has been adopted at the Washington Conference.

Oesterreichisch-Ungarischen Monarchie.—Specialkarte der —. Scale 1:75,000 or 1 geographical mile to an inch. K. k. militär-geographisches Institut, Wien, 1885. Sheets:—Zone 9, Col. XIX. Sillein und Waag-Bistritz; 9, XX. Rosenberg und Rutka; 11, XVIII. Nyitra-Zsambokrét und Piatyan-Teplitz; 13, XIX. Léva und Salló; 14, XX. Nográd und Waitzen; 15, XXIII. Besenyő und Tisza-Füred; 16, XXII. Jász-Ládany; 16, XXIV. Püspök-Ládany; 17, XXII. Szolnok; 17, XXIII. Kisujzállás und Mezötúr; 25, XVIII. Brod; (35, XV., 35, XIV., 36, XV.) Sv. Petar, J. Pelagosa, und Seg. Cajola; 35, XVI. Porto Rosso. Price 1s. 4d. each sheet. (Dulau.)

— Eisenbahn und Uebersichtskarte, von G. Freytag. Scale 1:3,000,000 or 41·6 geographical miles to an inch. Wien, Freytag und Berndt. Price 1s. (Dulau.)

Prussia.—Übersichts-karte der Verwaltungs-Bezirke der Königl: Preuss: Eisenbahn-Direktionen und der denselben unterstellten Königl: Eisenbahn-Betriebsämter in IX. Blättern. Scale 1:600,000 or 8·1 geographical miles to an inch. Bearbeitet im kartographischen Bureau des Ministeriums der öffentlichen Arbeiten. Berlin, 3te Auflage, 1885. Price 7s. (Dulau.)

ORDNANCE SURVEY MAPS.

Publications issued from 1st to 31st July, 1885.

6-inch—County Maps:—

ENGLAND AND WALES: **Oxfordshire:** Sheets 20: 2s. 6d.; 19: 2s. Quarter Sheets: **Bedfordshire:** 10 N.E.; 16 N.E.; 18 S.E.; 1s. each. **Derbyshire:** 43 N.W. with 21 N.W. (Staffordshire); 43 S.W.; 1s. each. **Devonshire:** 17 N.W., 17 N.E.; 18 N.E., 18 S.W., 18 S.E.; 64 N.W., 64 N.E., 64 S.W., 64 S.E.; 90 S.E.; 111 S.W.; 132 S.E.; 136 N.E.; 1s. each. **Gloucestershire:** 51 N.W., 51 S.E.; 1s. each. **Herefordshire:** 7 S.E.; 1s. **Leicestershire:** 9 N.E. with 58 N.E. (Derbyshire); 16 N.E., 16 S.E.; 28 N.E. with 3 N.E. (Warwickshire), 28 S.W. with 3 S.W. (Warwickshire); 32 N.W., 32 N.E., 32 S.W., 32 S.E.; 34 N.E. with 6 N.E. (Warwickshire); 39 S.W.; 40 S.W. with 13 S.W. (Rutland); 46 N.W., 46 N.E.; 1s. each. **Merionethshire:** 2 S.W.; 8 N.W., 8 S.E.; 17 N.W.; 1s. each. **Montgomeryshire:** 14 S.E.; 22 N.E., 22 S.E.; 28 S.E.; 35 S.E.; 43 N.E.; 48 N.W., 48 N.E., 48 S.W.; 1s. each. **Norfolk:** 23 S.E.; 24 N.W., 24 N.E., 24 S.E.; 29 N.E.; 30 N.W., 30 S.W.; 37 N.W., 37 N.E.; 39 N.W.; 40 S.W., 40 S.E.; 49 N.E.; 61 S.E.; 65 S.W.; 77 N.W., 77 S.W.; 87 S.W.; 110 N.E. with 25 N.E. (Suffolk); 1s. each.

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IRELAND: King's County (Revised). Sheets 2, 19, 20, 25, 28.

25-inch—Parish Maps:—

ENGLAND AND WALES: **Bedfordshire:** Colmworth, Area Book; Puddington, Ar. Bk.; Sharnbrook, Ar. Bk.; Willshamstead, Ar. Bk. **Cornwall:** Calstock, Ar. Bk.; Stoke Climsland, Ar. Bk. **Devonshire:** Ashbury, 2 sheets; Beaworthy, 5; Black Torrington, 1; Bradford, 1; Bratton Clovelly, 1; Halwill, 1; Holsworthy, 1; Milton Damerel, 2; Northlew, 3; Okehampton, 1; Sutcombe, 1; Thornbury, 1. **Gloucestershire:** Adlestrop, 1; Badgeworth, 2; Barnwood, 1; Brimsfield, Ar. Bk.; Broadwell, 1; Churchdown, 1; Churcham, 1; Clifford Chambers, 1; Cowley, Ar. Bk.; Down Hatherley, 1; Ebrington, 1; Elkstone, Ar. Bk.; Elmora, 1; Great Shurdington, 1; Great Witcombe, Ar. Bk.; Guiting Power, Ar. Bk.; Hardwicke, 1; Harescombe, 1; Haresfield, 2; Hempsted, 1; Hidcote Bartrim, 1; Higham Over, and Linton, 2; Hucclecote, 1; Ilmington, 1; Lassington, 1; Longford, 2; Malsemore, 2; Mickleton, 1; Minsterworth, 1; Oldington, 1; Painswick, 2; Pinnock and Hyde, Ar. Bk.; Pitchcombe, 1; Preston upon Stour, 1; Roel, Ar. Bk.; Sandhurst, Ar. Bk.; Side, Ar. Bk.; Standish, 1; Staverton, 1; Stonehouse, Ar. Bk.; Stroud, 1; St. Catherine with Kingsholm St. Catherine, 1; Sudeley Manor, Ar. Bk.; Twigworth, 1; Up Hatherley, 1; Whiteshill with Randwick, 1; Wotton St. Mary (Without), 1. **Herefordshire:** Brampton Bryan, 1; Bucknell. **Kent:** Hundred of Hoo (Adjoining the Parish of High Halstow), 1. **Leicestershire:** Burton on the Wolds, 1; Burton Lazars, 1; Castle Donington, 1; Cotes, 1; Hemington, 2; Hooton, 1; Lockington, 1; Loughborough, 1; Melton Mowbray, 2; Prestwood, 1; Scalford, 1; Sysonby, 1; Thorpe Arnold, 1; Welby, 1; Wyfordby with Brentingby. **Norfolk:** Aldeby, 3; Barton Bendish, 2; Barton Turf, 1; Beetley, Ar. Bk.; Broughton, 2; Caister next Yarmouth, 1; Caldecote, 1; Cockley Cley, Ar. Bk.; Colveston, Ar. Bk.; Cranwich, Ar. Bk.; Crumpleham, 1; Diddington, Ar. Bk.; East Bilney, Ar. Bk.; East Dereham, Ar. Bk.; East Somerton, 3; Fincham, 2; Gillingham, 2; Haddiscoe, 2; Hemsby, 1; Hickling, 3; Ingham, 1; Kirstead, 1; Lynford, Ar. Bk.; Marham 2; Mundham, 1; North Pickenham, Ar. Bk.; Norton Subcourse, 1; Old Buckenham, Ar. Bk.; Ormesby St. Margaret with Scratchy, 2; Ormesby St. Michael, 2; Oxborough, 1; Ralling, 1; Rollesby, 1; Rushford, Ar. Bk.; Scarning, Ar. Bk.; Seething, 1; Shingham, Ar. Bk.; Shouldham, 1; Shouldham Thorpe, 2; Smallburgh, 1; South Runcton, 1; Stalham, 2; Stow Bardolph, 1; Stradsett, 2; Sutton, 2; Thorpe next Haddiscoe, 2; Thurlton, 1; Toft Monks, 2; Wallington cum Thorpland, 1; Waxham, 2; Wereham, 1; West Somerton, 1; Winterton, 2; Woodton, 1; Worthing, Ar. Bk. **Northamptonshire:** Althorpe, 1; Boughton, 2; Bozeat, 1; Brington, 1; Brixworth, 1; Chapel Brampton, 3; Church Brampton, 3; Courteenhall, 1; Earls Barton, 1; Ecton, 1; Evenley, 1; Flore, 1; Great Billing, 1; Harlstone, 3; Harpole, 1; Holcot, 2; Holdenby, 1; Long Buckley, 1; Mears Ashby, 2; Moniton, 4; Overstone, 4; Preston Deanery, 1; Pitsford, 4; Quinton, 1; Sywell, 4; Watford, 1; West Haddon, 1; Wootton, 1. **Nottinghamshire:** Attenborough, 3; Averham, 1; Balderton, 3; Barton in Fabis, 1; Bathley, 2; Baddy, 1; Carburton, 1; Cannott, 2; Coddington, 1; Cotham, 1; Cuckney, 1; Eakring, 1; East Stoke, 3; Edwinstowe, 1; Elston, 1; Farndon, 4; Hawton, 2; Kneesall, 1; Langford, 1; Laxton, 1; Newark upon Trent, 1; Norton, 2; Norwell, 1; Ompton, 1; Ratcliffe upon Soar, 1; Rolleston, 2; Rufford, 2; Stanford upon Soar, 1; Stapleford, 4; Staythorpe, 1; South Collingham, 1; South Muskham, 1; Thorpe, 4; Thumpton, 1; Welbeck, 2; Wellow, 1; Winthorpe, 1. **Rutland:** Ashwell, 1; Barrow, 1; Casterton Magna, 1; Cattesmere, 1; Empingham, 1; Horn, 1; Market Overton, 1; Pickworth, 1; Teigh, 1; Tickencote. **Shropshire:** Acton Scott, Ar. Bk.; Aston Botterell, 1; Bucknell, 2; Clun, 1; Clunbury, 1; Dowles, Ar. Bk.; Farlow, 1; Greet, 1; Kinlet, Ar. Bk.; Loughton, 1; Nash, 1; Silvington, 1; Wheathill, 1; Whittington, 1. **Somersetshire:** Backwell, 1; Barrow Gurney, 1; Burrington, 1; Churchill, 1; Congresbury, 2; Farleigh Hungerford, 2; Flax Bourton, 2; Freshford, 1; Hinton Charterhouse, 2; Kewstoke, 1; Kingston Seymour, 2; Long Ashton, 2; Road, 1; South Stoke, 1; Tellisford, 2; Wellow, 2; Woolverton, 1; Wick St. Lawrence, 1; Wraxall, 1; Wrington, 1. **Staffordshire:** Brewdon, Ar. Bk.; Cheslyn Hay, Ar. Bk.; Kings Bromley, London, Ar. Bk.; Sharnhall, 1; St. Chad, St. Mary, The Close, The Friary, and Farewell and Chorley (Det.), Ar. Bk.; St. Michael, Ar. Bk. **Suffolk:** Badley, Ar. Bk.; Bardwell, 1; Barking, 2; Battisford, 1; Bayham, 1; Beccles, 2; Bilderston, 2; Cavendish, 1; Corton, 1; Creeting St. Mary, 1; Creeting St. Peter, 1; Ellough, Ar. Bk.; Glemsford, 1; Gorleston, 1; Great Bricett, 2; Herringfleet, 1; Hitcham, 1; Hopton, 1; Moulton, 1; Nedging, 2; Offton, 2; Ringsfield, Ar. Bk.; Ringshall, 2; Rushmere, Ar. Bk.; Stoven, Ar. Bk.; Wattisham, 2; Willingham, Ar. Bk.; Worlingham, 2. **Warwickshire:** Alcester, 1; Arrow, 1; Atherstone upon Stour, 1; Ilmington, 1; Whitchurch, 1. **Worcestershire:** Abberton, 1; Abbots Lench, 2; Acton Beauchamp, 2; Alderminster, 1; Bayton, 1; Bengeworth, 1; Bedford, 3; Birlingham, 1; Bishampton, 3; Broadwas, 1; Church Lench, 3; Cotheridge, 1; Croome D'Abitot, 2; Crothorne, 1; Crowle, 1; Delford, 1; Doddenham, 1; Dodderhill, 2; Fladbury, 1; Grafton Flyford, 1; Grimley, 1; Hallow, 2; Hampton Lovett, 1; Hambury, 1; Hill and Moor, 3; Holy Cross (Pershore), 3; Huddington, 1; Kempsey, 1; Kenswick, 2; Kidderminster Borough, 1; Kidderminster Foreign, 1; Knightwick, 1; Knighton upon Teme, 3; Lindridge, 1; Mable, 2; Martley, 1; North Piddle, 1; Norton, 1; Norton Juxta Kempsey, 1; Pirton, 2; Rochford, 1; Salwarpe, 1; Severn Stoke, 2; St. Andrew, 2; St. Andrew (Pershore), 2; St. John Bedwardine, 2; St. Peter, 1; St. Nicholas, 2; Stoke Prior, 1; Stoulton, 1; Suckley, 1; Tenbury, 1; Throckmorton, 2; Upton Snodsbury, 1; Upton Warren, 1; Westwood Park, 1; Wichendon, 2; Wick, 1; Wickhamford, 1; Wyre Piddle, 1.

Town Plans:—

ENGLAND: scale 1:500. Newtown, 12; Northampton, 8; Oldbury, 18.

IRELAND: 5 feet scale. Belfast (revised), 7 sheets, completing the revision of Belfast.

(Stanford, Agent.)

ASIA.

Afghanistan.—Map of North-West ——. Scale 1:633,360 or 8·68 geographical miles to an inch. Compiled and lithographed at the Intelligence Branch, War Office, under the direction of Major W. R. Fox, R.A., D.A.Q.M.G., September 1885.

Bering-Insel.—Umriss-Skizze der —, hauptsächlich nach eigenen Aufnahmen von Leonhard Stejneger. Scale 1:383,000 or 5·2 geographical miles to an inch. Deutsche geograph. Blätter, Band VIII. Tafel 5.

— Der Grebnitski-Hafen auf der —. Nach seinen Aufnahmen im Jahre 1882 gezeichnet von Leonard Stejneger. Deutsche geograph. Blätter, Band VIII. Tafel 6. Geograph. Anstalt von Wagner & Debes, Leipzig. (*Dulau.*)

Java en Madoera.—Sporweg-Kaart van — met aanduiding der overige hoofdc communicatie-middelen te land en ter zee, te zamengesteld door J. W. Stemfoort en J. Hora Adema. Scale 1:1,000,000 or 13·6 geographical miles to an inch. Uitgave van Jos. Smulders en Cie. 2 sheets. Price 7s. (*G. Philip & Son.*)

The railways, completed and projected, are shown on this map, together with other means of communication, such as tramways and waggon roads, steamboat routes from port to port, stations of garrisons, residential boundaries, and much other interesting information.

Philippines.—Carte générale des îles —, avec itinéraires du docteur J. Montam, 1879–81, à l'échelle de 1:6,500,000 or 89 geographical miles to an inch. Gravée par Erhard, dressée par J. Hansen. Paris, Erhard. (*Dulau.*)

AFRICA.

Kamerun-Gebiet.—Das Südliche —, Nach eigenen Aufnahmen von Hugo Zöller, 1885. Scale 1:750,000 or 10·3 geographical miles to an inch. Mittheil. der Afrikan. Gesellschaft in Deutschl., Bd. iv. Taf. 13. (*Dulau.*)

This map contains some interesting additions to our geographical knowledge of this portion of the West Coast of Africa; the course of the Moanja river being, for the first time, laid down for a distance of 30 miles into the interior, and several of its affluents in the Batanga and Bakoko districts are also shown. With the exception of a few towns near the coast, the whole of the country between the Moanja and Muni rivers has hitherto appeared as a blank on our maps, but it is to be hoped that, in the course of a few months, some additional information as to the interior of this region will be received from the Spanish exploring expedition, which under the command of the Governor of Fernando Po has ascended the Muni river, with the intention of ascertaining whether the Sierra do Cristal constitutes the water-parting between that river and the Benito.

Kuango.—Skizze des Gebietes zwischen Vivi und dem — mit den Routen von Lieut. Schulze und Dr. Wolff. Zusammengestellt von Richard Kiepert. Scale 1:750,000 or 10·3 geographical miles to an inch. Mitth. der Afrikanischen Gesellschaft in Deutschland, Bd. iv. Taf. 12. (*Dulau.*)

In addition to the routes followed by Lieut. Schulze and Dr. Wolff, those of Major von Mechow and Mr. Comber are given.

Somali Land.—Übersichtskarte von dem Gebiet der Ejssa-Somäl, von Hárär, und den nördlichen Galla-Ländern von Prof. Dr. Philipp Paulitschke. Scale 1:1,000,000 or 13·6 geographical miles to an inch. Nebenkarten: Planskizze von Hárär 1:16,000. Der Haramája-See. Plan der Ruinen von Bia Woräba. Die heissen Quellen von Hárutu. Durchschnitt längs der Route; 9 Profilsansichten, 'Petermann's Geographische Mittheilungen,' Jahrgang 1885, Tafel 17. Justus Perthes, Gotha. (*Dulau.*)

Tunisie et de l'Algérie orientale.—Cartes des principales voies de communication de la —, à l'échelle de 1:3,200,000 or 43·8 geographical miles to an inch. Paris, Chaix. (*Dulau.*)

AMERICA.

South America.—"South American Journal" Railway Map of —, showing the railways constructed, and in course of construction, with some particulars as to location of Mines, Land Companies, and Sugar Factories in South America. Scale 1:6,971,500 or 95·5 geographical miles to an inch. Published by Bates, Hendy & Co., London.

This shows the great progress in railway construction which has taken place within the last few years in South America, and will be very useful to all who are engaged in trade with that continent. It is the first railway map of South America, on a convenient scale, that has been published in this country.

PACIFIC OCEAN ISLANDS.

Carolinen, Marshall- und Palaw-Inseln.—Karte der —, mit Detailplänen der Inseln (Yap, Ponapis, Kusaie, etc., von G. Freytag. Scale 1:5,200,000 or 71·2 geographical miles to an inch. Wien, Freytag. Price 1s. (*Dulau.*)

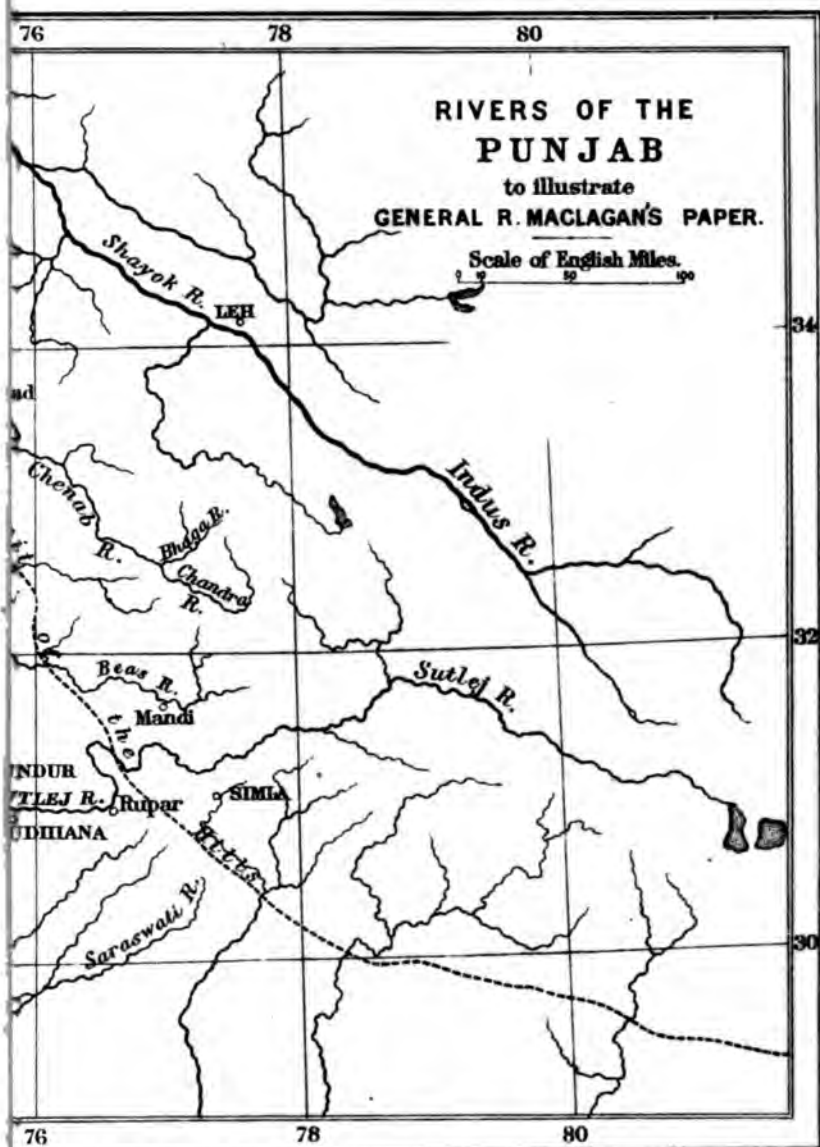
ATLASES.

England.—Philips' Atlas of the Counties of —, including maps of North and South Wales, the Channel Islands, and the Isle of Man. Reduced from the Ordnance Survey, and coloured to show the new political divisions, according to the Redistribution Bill 1885. New and revised edition, with a complete consulting Index. G. Philip & Son, London and Liverpool. Price 2l. 2s.

This is a new edition of Philips' County Atlas, and contains many corrections and additions, which is especially noticeable in the railways, and the system of colouring by which the political divisions are distinguished. The maps are reductions from the Ordnance Survey, and are drawn on a sufficiently large scale for general reference.

—— Philips' Handy Atlas of the Counties of —, including maps of North and South Wales, the Channel Islands, and the Isle of Man. Reduced from the Ordnance Survey, and coloured to show the new parliamentary divisions, according to the Redistribution Bill 1885. New and revised edition, with consulting Index. G. Philip & Son, London and Liverpool. Price 3s. 6d.

This is one of a series of county atlases, of which Scotland, Ireland, and Wales have already been published; it contains a great deal of the information to be obtained in the larger atlas and is in small octavo form. At the end there is a copious index giving the position of each town.



the Royal Geographical Society, 1885.

Edward Weller.



PROCEEDINGS

OF THE

ROYAL GEOGRAPHICAL SOCIETY

AND MONTHLY RECORD OF GEOGRAPHY.

Address on the opening of the Session 1885-6. .

By the Most Hon. the MARQUIS OF LORNE, K.T., President.

(Delivered at the Evening Meeting, November 16th, 1885.)

ON the reassembling of the Society after the summer vacation, it is usual for your President to preface the work of the Session by a short address, summarising the principal geographical events of the months that have intervened since we last met, and announcing the prospects of the new session. In following this custom I will make my remarks as brief as possible, knowing that the chief business of the present meeting is the reading and discussion of the important paper by Mr. Hallett on his survey of a railway route from British Burmah towards the frontier of China, a region which occupies at the present time so large a share of public attention in this country.

The closing meetings of our last Session, held after the delivery by your former President of the Annual Address on the Progress of Geography, were occupied by the reading of two important papers, both dealing with new explorations of considerable extent and importance; these were Sir Peter Lumsden's account of the countries bordering the northern frontier of Afghanistan, and Mr. James's narrative of the journey of himself and party through the interior of Somäliland. Both these papers, illustrated by original maps, which add very greatly to our geographical knowledge of the respective regions, have been since published in our monthly 'Proceedings.' With regard to the Afghan frontier and its contiguous countries, of which Sir Peter Lumsden gave us so graphic an account, giving some of the results of the survey down to the date of his paper, surveys have been since continued, and we may in the course of the Session expect to receive other papers, giving similar new and accurate information, conveyed in the same lucid manner. We have, indeed, already received an account by Major Holdich of the observations carried out for the purpose of fixing the exact geographical position of Mashad, so necessary for connecting the survey operations of India with those of the Afghan border and

North-eastern Persia, and at an early meeting you will hear from Colonel C. E. Stewart the results of his long-continued observations in the valley of Herat and along the Persian frontier.

The African explorations of the Messrs. James have been quickly followed by other explorations and discoveries in other parts of the continent, news of which has reached us since the close of our last Session. The most important of these relate to the basin of the Congo, the upper waters of which and the direction and extent of the numerous great tributaries were previously almost unknown, and indeed formed the principal remaining blank in our maps of Central Africa. The information we have received during the past few months enables us to form a much juster conception than was formerly possible of this vast fluvial system of Western Africa. The first discoveries were made by our Associate, the Rev. G. Grenfell, who in the early months of this year made a voyage with his wife in a small steamer belonging to the Baptist Missionary Society as far as Stanley Falls, during which he ascended nearly all the larger tributaries both to the right and to the left, steaming up them in most cases as far as they were navigable. Into the details of his explorations I will not now enter; the admirable charts plotted by this intelligent traveller are mostly in our hands, and we hope in the course of the ensuing Session to lay them and the author's narrative before the Society. One of Mr. Grenfell's discoveries, however, I may specially mention as likely to prove of cardinal importance to the cartography of Central Africa. This is the river Mobangi, a northern tributary of the Congo, up which he ascended for more than five degrees of latitude, finding it as far as his furthest point a fine navigable stream. The sources of this river must lie near to those of the Benue, the great eastern branch of the Niger, and it traverses the wide blank space which has hitherto existed on our best maps between the Benue and the northern bend of the Congo. It is in this direction that the great river Kuta, heard of as flowing from east to west by Dr. Barth, and the river Wellé discovered by Schweinfurth in the remote interior west of the Upper Nile, are supposed to lie; discussion will therefore be rife among speculative geographers as to the probable connection of these rivers, until Mr. Grenfell or some other enterprising traveller solves the problem by actual exploration. Another discovery of similar importance was made during the same months, on the opposite, or southern side of the Congo, by Lieutenant Wissmann, already known for his successful journey across the Continent, from Loanda to Zanzibar, a short time ago. In conducting a second expedition, sent out by the International Association, Lieutenant Wissmann descended the great southern tributary, the Kassai, navigating it for hundreds of miles through a fertile, populous, and previously unknown region to its junction with the Congo, and finding that several other rivers, east and west, hitherto supposed to have independent courses, including the

Quango, were its tributaries, the collected waters disemboing in the Congo in one large stream, the mouth of which has hitherto been known as the Kwa.

The other explorations to which I have alluded were near the headwaters and sources of the Congo. One was conducted by the eminent Portuguese travellers, Messrs. Capello and Ivens, who started from Mossamedes, on the Atlantic coast, in March 1884, and crossed the Continent by a new route, reaching Quillimane, on the shores of the Indian Ocean, in July last. The chief objects of their expedition were to define the watershed along the unexplored central tract between the sources of the Congo and the northern tributaries of the Zambesi, and to visit a great native trade-mart reported to exist in this direction. They accomplished both objects, examining, as their preliminary report states, the sources of both the Lualaba and the Luapula of Livingstone, and visiting the capital of the powerful chief Muxiri or Msiri, near Katanga, a district renowned for its copper mines, of which Livingstone so frequently heard. Messrs. Capello and Ivens were preceded in this remote region by the German East African Expedition, under Herr Reichard and Dr. Böhm, which after five years' continuous exploration to the east of Tanganyika crossed that lake, and between the months of September 1883 and November 1884, struck across the unknown central regions to the south-west, and were detained several months by the same chief of Katanga visited by the Portuguese travellers. The work of these two expeditions has not yet been fully compared, but the combined results will apparently be to give us a fairly satisfactory knowledge of the various streams with their great lakes, of which Livingstone could only give us hearsay information, and which together form the sources of the Congo.

Numerous other explorations, and additions of greater or less extent to our geographical knowledge of distant regions, have been reported during the recess; but it is impossible for me, even in the most cursory manner, to review them in the present brief address. I must, however, briefly mention two expeditions in which the Society is especially interested, having contributed towards their expenses, namely that of Mr. H. O. Forbes to New Guinea, and that of Mr. Last to the interior of Mozambique and Lake Kilwa. Mr. Forbes, I am happy to say, has, by the last accounts, arrived at Port Moresby and commenced his journey in the interior accompanied by the Rev. Mr. Chalmers. Mr. Last left Zanzibar for Lindi, where he would start on his long overland journey, on the 10th of October. Results of great interest and value in more than one branch of science are anticipated from both these expeditions.

As one of the geographical events of the past vacation, I ought not to pass over the meeting of the British Association, which was held this year at Aberdeen in September, and the Geographical Section of which evinced more than its usual activity. Five meetings of the Section

were held, at which thirty-three papers were read. The Section had the advantage of being presided over by one of our most eminent geographers, General J. T. Walker, the late Surveyor-General of India, whose admirable address on a subject which has been, I may say, the study and occupation of his life, namely, the Trigonometrical Survey of India, is, and will remain, an authoritative and useful historical and descriptive account of this truly imperial undertaking. Many of the other papers read and discussed in the Section related also to Indian subjects, and I need not further allude to them, as some of them have already been published *in extenso* in our 'Proceedings,' and others will shortly appear in our 'Supplementary Papers' or in other scientific periodicals.

It remains for me to announce an important step which your Council have taken in a matter which has engaged much of their attention during the past two years, and has lately excited, I am glad to say, considerable public interest. I mean the improvement of geographical education in the schools and colleges of this country. You are aware that the Council two years ago abandoned their system of geographical prizes offered annually for competition to the chief public schools, and preparatory to taking steps to supply their place by some more efficient action, despatched Mr. Keltie on a tour of inspection to schools and universities at home and abroad, with a view to obtain accurate information as regards the place occupied by geography in education, and the methods and appliances used in teaching the subject. Mr. Keltie's full and admirable report was issued a few months ago, and has since been widely circulated. The Council will deal with the subject, and decide what further steps can be taken, in the course of the session on which we have now entered, and meantime, it has been decided that a public exhibition shall be held under the auspices of the Society, of the appliances collected by Mr. Keltie in the course of his tours, consisting of school wall-maps, relief maps of various kinds, globes, models, graphical illustrations, text-books, and so forth. By inspection and study of these specimens, head-masters of schools, teachers, and all who are interested in geographical education, will, it is believed, derive valuable information regarding the methods of instruction which have been so fruitful of results in various foreign countries, and ascertain which of them, if any, might be profitably introduced, or modifications of them, into this country. Three spacious galleries for the purpose of the exhibition have been engaged at 53, Great Marlborough Street, and we hope to be able to open it to Fellows and the public in the first week of December.

An Exploration of the Goajira Peninsula, U.S. of Colombia.

By F. A. A. SIMONS.

Map, p. 840.

SINCE the publication of my last paper on the Sierra Nevada in 1881,* I have been commissioned by the National Government of Colombia to survey the two Atlantic States of the Magdalena and Bolivar, and especially to write a report on the hitherto unexplored region of the Goajira Indians. A summary of this I have now the honour of laying before the Royal Geographical Society.

The north-easterly corner of the United States of Colombia (formerly New Granada) terminates in a large peninsula, that, projecting for some 120 miles out into the Caribbean Sea, forms the extensive Gulf of Maracaybo. This peninsula is known as the Goajira. It was ceded by the State of Magdalena in 1872, to form a National Territory, for the better civilisation of its Indians. One half of it, however, is claimed by the Venezuelans, and a dispute that at one time threatened to culminate in war between the two nations, was amicably settled by referring the question to the King of Spain as arbitrator. His decision has not yet been made public. Three-fourths surrounded by sea, the Goajira is on the land, or south-westerly, side separated from the State of the Magdalena by a natural boundary, formed partly by the Rio Rancheria, with the outlying hills of the Nevada, variously called in old maps Cerros de Soldado, de Barrancas, &c., and partly by the Montes of Oca.

Very little or nothing is known of the history of these Indians. Although the peninsula played an important part in the first discoveries, none of the early chroniclers seem to have paid much attention to the country. Juan de Castellanos, who resided some time at the Cabo de la Vela, dedicates a "solo canto" to the pearls. The "Floresta de Santa Marta," written by José Nicolas de la Rosa in 1739, gives many interesting data on the customs and manners of the Indians; this work must have supplied the more recent writings on the subject, for the same errors run through them all. That the present race are not the original inhabitants of the peninsula is certain. The Indians themselves have a legend that they came from a great distance, and are able to point out traces of villages belonging to the former inhabitants, whom they assert are the Arhuacos of the Sierra Nevada. Sometimes their old graves are accidentally come across, yielding to the fortunate finder a rich harvest of *tumas* (pieces of polished stone with a hole drilled through), curiously shaped pieces of gold, and other ornaments (clay), identical with those found in great profusion all over the Sierra Nevada. Now,

* 'Proceedings R. G. S.,' 1881, p. 705.

these tumas are all made from carnelian, jasper, or other reddish varieties of silica, and the stone, according to the Indians, is not to be found in the Goajira. While ascending Macuira, several places were pointed out to me, especially near the top, in which I was entreated to look for treasure "of the Arhuaco." They themselves, although coveting tumas above everything, are, curiously enough, afraid to look for them, not hesitating, however, to appropriate any found by chance. This, combined with the fear of mentioning their dead, points to some sort of religion or belief in a superior Being. They evidently took possession by conquest, driving the weaker "Arhuaco" out, and have managed to assert their rights to this day. It is rather an historical anomaly that such a small tribe, which probably never exceeded 80,000, should have been able to conserve intact their absolute freedom, their manners and customs uncontaminated, in spite of the accessibility of their territory, surrounded as it is by the sea, and the continual commerce that has been going on for centuries.

Commencing with the topography of the country, the mountain system attracts attention most—more so, as a remarkable error has been propagated, that the Goajira is one large fertile plain with only one or two isolated hills. At least one-half of the country is hilly. There are in fact two Goajiras; one known as the Lower Goajira is the broad level plain extending from the river Rancheria to a little beyond the Teta. The other, or Upper, Goajira is the hilly sterile region between the Teta and Punta Espada. The Upper Goajira is simply a volcanic eruption, a conglomeration of low hills, conspicuous from the many cone-shaped forms, and the parallel ridges in which they have been thrown up. These parallel lines run chiefly north-west by south-east, and are separated by two large plains, thus forming three distinct groups of hills running from sea to sea. The first and most important of the three is the easterly or Macuira range. This fine, bold, interesting mountain mass rises in front of Chimare, about 12 miles from the sea-shore, and terminates at the most easterly point of the Goajira, forming the rocky headland known as the Punta Espada (Jurién). Due to its elevation and position, it serves as a species of cloud-trap detaining the lower clouds that drive in from seawards impelled by the easterly or trade winds, that blow here with great force most part of the year. This is the only spot in all the Goajira that can really be called fertile. I ascended the two highest points. The north or Macuira proper lies in front of Puerto Estrella, and is composed of several peaks ranging between 2400 and 2600 feet above sea-level. None of them offer any difficulty in climbing, as the slopes are covered with gardens to within 500 feet of the top. The vegetation is similar to that of the Sierra Nevada at 6000 feet, and the temperature was very low, showing at midday 65° Fahr. The highest point at the southern extremity in front of Punta Espada is Ara-ura. Owing to the low dense

bush I could only reach 1700 feet, the limit of the Indian gardens, where plantains, maguey, onions, coca, sugar-cane, &c., were growing; also a rivulet with running water. The ground about here is well cultivated, supplying most of the Goajira with grain food. Many small low castes of Indians dedicated to agriculture live here; they are all poor, as agriculture is not considered wealth among the Indians.

The second or central range, which for want of a better name I shall call Parashi Hills, are entirely separated from the Macuira range by a plain some nine miles broad. This plain gradually rising from both seas, reaches 350 feet towards the centre. These hills rise at Bahia Honda almost from the margin of the bay, and stretch as a narrow belt right across the peninsula. Formed of ridges of low hills seldom exceeding 1500 feet, covered with a scanty wood of brazilete, divi-divi, cacti, and other prickly bushes, intersected by valleys, one mass of prickly pear, they present a desolate forlorn appearance two-thirds of the year, yielding, however, during the short rainy season abundant pasture. In this range, as with the former, there are two prominent peaks. The northerly one, a conspicuous object from Portete and Bahia Honda, is called Ruma. I ascended it with much difficulty, and found the height to be 1950 feet. Sierra Ipapa, marked on some maps, is probably Ruma.

Some 15 miles south of Ruma, Guajarepa rises well out of its surroundings. This, the highest point of the range, does not exceed 2200 feet, and must be the Cerro Aceite of the Spaniards, supposed to be the highest peak in the Goajira, but it is seen that Macuira dominates it by at least 400 feet. A portion of this range is also called Cerros de Jallarure from a rancho at the foot of Guajarepa. Between the highest peaks and towards the south is the extensive plain of Ataipa. We now come to the third or Ojoro range, separated by a rather tortuous valley, varying much in breadth, about six miles at the narrowest place. These hills are more extensive than either of the two first, and show many peculiarities, being flanked on all sides by numerous isolated knife-like ridges, some running parallel to each other with broad valleys between, while others are complete segments of circles. Towards the Maracaybo shore are several large mountain masses. The highest, Yuripiche, is a wonderful mass of igneous rock some 2800 feet in height. Close by, another mountain, Auipana, plays a prominent part in the landscape. All these hills, like Parashi, are destitute of vegetation, many so steep that the bare rock and stone-slides put all idea of growth out of the question, and with their weird shapes, immense boulders, and caves, form a fitting retreat to the Cocinas or Robber Indians. The celebrated Teta Goajira may be considered as belonging to this range, for although entirely isolated and some nine miles distant, it is indirectly attached by two small separate hills. The Teta is certainly one of the most beautiful sights in the Goajira, and

on a clear day can be seen from any point in it. On the west side a small hill attached spoils its beauty, seen from seawards, otherwise it is perfectly symmetrical in form. The Indians call it Jepitz. It lies in the Cocina district, and is the most dangerous portion of the Goajira. To visit it, I had to persuade Martin, one of the great chiefs, to accompany me with his three sons, uncles, nephews, &c. We started at daybreak, rode all day, and arrived in time to see the sunset from the top. We only saw three Indians the whole day, yet Martin assured me that all our movements were watched, and pointed out to me two probable places where an ambuscade would be planned for our return. We returned by a different road, getting back at 4 A.M. tired, hungry, and thirsty. I found the height to be 1200 feet above sea-level, or 900 feet above the plain. The rock is composed chiefly of trachyte with large crystals of felspar, similar to those of the Drachenfels on the Rhine. As also belonging to this group may be considered the two isolated hills rising in front of Cardon de los Remedios and Carrisal, close to the north spur of the Cojoro range, called Jallare. They are both insignificant and do not exceed 400 feet in height. The Cerros de Carpintero, a small group of hills behind the Cabo de la Vela, are of more importance, they are about 700 feet above sea-level. From Cabo de la Vela to Puerto Estrella, between the hills and the sea, are innumerable cliffs and banks rising to 200 feet, usually with very abrupt edges, and covered with rolled stones.

Rivers properly speaking there are none in the Goajira. The country is cut up in all directions by shallow, dry, sandy beds of watercourses, that during the rainy season carry off the water as fast as it falls. Not even the Macuira Hills are able to send a flowing stream to the sea during the summer, which here lasts at least eight months. It will have been remarked that the Indians have no collective name for their mountains, each little projecting point rejoicing in its own name. With their rivers it is still worse, for not only every water-hole adds a new title to a river—and these are innumerable, the custom being to dig for water in the sand of the watercourses, and as these wells dry up others are dug farther up stream—but every path that crosses the watercourse has its name. Even any prominent rock or large tree is enough to add to the interminable list of river nomenclature. On the plains below the Teta the drainage is effected by numerous small streams winding about in a most bewildering manner, and although perfectly dry, they usually have pools of muddy water at the bends. As the plain is little above sea-level, the water has cut deep zigzag channels, very different from the shallow sandy beds of the hills. The water remaining dammed up, instead of gravitating to the sea, causes the great fertility of the plains.

The principal source of water for the Indians are wells. These are of two kinds; first, the most common, by digging, usually in the dry

bed of a watercourse. As the season advances, and the water recedes, they either dig after it or search for a lower level. Wells of 30 to 40 feet are very common. The water is reached by a staircase cut in the sand with an easy incline. Wells are easily distinguishable from a distance by the water-troughs, hollowed out of divi-divi trees, and called canoes. These are of the most distorted and grotesque shapes, and serve to water the herd. This is very hard work for the poor Indians during the summer months, and usually employs the whole day. Water from wells if taken early in the morning is always clear and cool. When bathing at a well the Indian uses a canoe; if he stops to drink, a bath invariably follows. Every well has a name, and the country is perforated by them like a mining camp. The wells of Chimare are phenomenal; dug out on the sea-shore, on a narrow strip of sand 100 yards in breadth, with the sea on one side and the salt-pans of Chimare, with layers of salt many feet thick, on the other, the water is, notwithstanding, perfectly fresh. There are seven holes about 10 feet deep. I may mention that Parashi is the name of a celebrated well dug in the river that drains the eastern flank of Ruma. It means "salt," probably because the water is brackish.

Second in importance are the water-tanks or *casimbas*. These are sometimes natural, as a small lake at the foot of Ruma and the casimbas of Cojua, filtrations from the river Naima, forming a large lake in the rainy season and many small dirty pools in summer, but nature aided by art is the rule. Some are immense undertakings, and large sheets of water, calculated to last a summer through if not too severe; such as Ariapá, the casimba of Puerto Estrella, a large crescent-shaped piece of water of about a quarter of a square mile. The water of these casimbas is always muddy and filthy for drinking purposes. The herds are driven in, and every Indian that passes is sure to bathe, so that in time almost a skin of grease forms on the top; and yet in places where they are it is the only water to be had, truly meat and drink combined.

The Goajira coast abounds in harbours and bays, but none of much importance. Between Rio Hacha and Cabo de la Vela, in the extensive bay formed by the latter, anchorage is found almost all along the coast. Numerous roadsteads have become known through the commerce with the Indians, and quite a large trade is carried on in the small coasting schooners. Further along the coast are three large bays. The first, or Portete, is a large bay, well protected from the easterly trades, and is certainly the best port along the coast. Unfortunately the entrance is narrow, intricate, and with shoals. The next, Bahia Honda, is almost a complete oval, some eight miles long by three miles broad, and with an entrance of nearly three miles broad. It is separated from the sea by a stone wall from 60 to 80 feet at the highest, but not enough to protect the bay from the strong easterly winds that blow with such force here. It makes but a poor harbour, the surf inside during the afternoons pre-

venting anything being landed dry. The Colombian Government erected a guard-house at the entrance of this bay last year, but I am afraid it will have to be abandoned as untenable. Puerto Estrella makes a very bad port, the small trading schooners having to lie in under the breakers. This is the last recognised Colombian port, at least pending the arbitration question. The next good port is the Laguna de Tucacas, in the Gulf of Maracaybo. This place is much frequented by Venezuelans, and a trade has sprung up that if not checked will ruin the already drooping commerce of Rio Hacha. The last port on the coast is that of Cojoro, and spoken of as the future port of Maracaybo, with which it would have to be connected by rail, an engineering feat of not much difficulty. The *ensenada* or bay of Calabozo has an inaccessible, heavy, surf-beaten coast.

The peninsula is inhabited by only one tribe of Indians. These are subdivided into many families or castes, bearing much analogy to the ancient "clans" of Scotland. Each caste or rather family circle is united against all comers, taking up the quarrel of any one of its members to make it general. The Goajiros are strictly conservative and aristocratic in their ideas, wealth and interest are omnipotent. A poor man may be insulted with impunity, when the same to a rich man would cause certain bloodshed. They have no veritable rulers, but each community recognises the wealthiest of its members as the chief or corporal, as he has been dubbed by the Spaniards, and look to him for protection. An Indian born poor, cannot become wealthy and great. Whatever herds he may accumulate, his humble origin would never be forgotten; he could, however, marry into a high caste family, having the means, and his children could become, through their mother's relations, great chiefs. Besides the name, each caste or family represents some animal, and many of the minor castes, over and above their own symbol, adopt another of some more powerful denomination, to enjoy the privilege of a god protector. There are at present, altogether, some thirty odd castes among the Goajiros. Of these I was able to discover the names of twenty-two. The remainder are insignificant, little known castes, chiefly inhabiting the hills. There are about ten of importance, chief among these the "Urianas." This, the largest caste in the Goajira, has subdivided or split up into many ramifications, such as Uria tiger, Uria rabbit, Uria paularate (a song bird), Uria gecko (lizard). This family is at present not only by far the most numerous, but also the richest; due to its connections by marriage with the Pushainas, formerly the wealthiest of the land. The Pushainas are to-day still great holders of *tumas* and ornaments, but with the Indian, only cattle, mules, and horses are real estate. The Urianas on receiving the *tumas*, sold out for cattle. The second in numbers are the Epieyues, as a rule they are poor. Under their protection are the Secuanas, again under these the small caste of the Guorguriyues. A full list will be given

in an Appendix. With the exception of the Jirnués or Piesies, a small tribe of 200 souls all told living in the valley of Macuira between Ara-ura and Itujoro, the Guáriríes, a mere handful of Indians under the protectorate of the Jirnu, the Sijuanas, Secuanas, Arapainayúes, Sámuriues, Araurujunas, and the Arpusiatas, all small local tribes, strictly confined to the upper country or east of Cabo de la Vela, the other castes are distributed throughout the breadth and width of the land in the greatest confusion. Living as the Goajiro does, in continual strife and warfare, whole families would speedily become poor or extinct, if they did not take the precaution to separate their wealth and herds, and only keep a few in one place at a time. Scarcity of water and pasture compels them to lead a nomadic life, and makes house-building out of the question, for they are eternally changing abode, now in the upper Goajira and then in the lower or plains. Some branches among the castes have, in spite of their roving propensities, predispositions for certain spots. For example, the proud and wealthy Pushainas are chiefly found round and about Parashi and Ataipa. Urianas tiger frequent Taroa and Bahia Honda a great deal, while near Portete, Ipuanas and Epinayues abound. In the neighbourhood of Auipana the Ipuanas and Jusayues are in great force; at the Teta nearly all are Jusayues, and near Las Guardias at Guarero, Sapuanas; these three latter are mostly all Cocina Indians. With respect to these terrible Cocinas, the word in Goajira signifies robber, highwayman, or outlaw. They are neither a tribe nor even a separate caste as many have supposed, but simply a band of freebooters—Indians that, for quarrels, murder, thefts, &c., have been expelled the family, and must needs take to pillaging to earn a livelihood. For self-defence, and to better ply their nefarious calling, they are banded together with recognised chiefs, and so are able to go on their marauding expeditions in great force, pouncing on any less numerous or unprepared party, to strip them of everything. One party of Cocinas will rob another if they can. Nearly all the Goajiros have relations among them, but an Indian is only safe with that band to which his relation belongs. They have commercial intercourse with them, and often succeed in getting stolen cattle back. The Cocinas' territory *par excellence* is the Cojoro range of hills, taking in the Teta, traversing the plains in a narrow band, and occupying the Montes of Oca as a refuge while scouring the plains. The country as far east as the Macuira range is not exempt from their depredations, especially between Ciapana and the Laguna of Tucacas. The principal Cocina chiefs are Alyechipara or Yorujama, as he frequently is called, an Uriana, and rules the country about Auipana and Yuripiche—he is the worst and most feared of the lot; Perón, an Arpushaina, another devil—he has appropriated the district of Cojoro; Masapain, a Josayú, lords it all about the Teta; and Merejildo, a Sapuana, is chief of the country about Las Guardias. Once the terror of the plains, this wild beast has

been completely tamed by the Venezuelans. He, with of course his followers, have found honesty the best policy after all, and are now reformed and peaceful members of society, returned to breeding and agriculture. This shows what can be done with firmness combined with a little judicious tact and management.

The Indians build no elaborate dwelling-houses. Their best ranchos are simple, and constructed in a short time. The roof is covered with the split woody core of a tall euphorbia. This makes a good cool roof, impermeable to water and easily removed when the family flits. The rancho is seldom used for sleeping purposes; for this numerous poles (*tehepes*) are firmly fixed all over the place for swinging hammocks, often three and four to one pole, and crossing each other. Sometimes two and three sleep in a hammock. Further off other poles (*palúmales*) are found, to tie animals up at, and a small corral or sheep-pen for the goats and sheep is also indispensable in every well-regulated family. The site of a rancho is always carefully chosen, much strategy being displayed in locating the whole, so that each rancho covers the other without itself being seen. Although villages are never attempted, yet a family rarely lives isolated. Everybody bolsters himself with that bugbear of Goajira society, his relations. Their ranchos are always within gunshot distance, so as mutually to defend each other. One is invariably on high ground to dominate the country, the rest are hidden away in nooks and corners where least expected. If one rancho is seen, others are close at hand. In case of attack, this system prevents a whole family being exterminated. One or two ranchos may be taken, but the rest escape or fly to the rescue, as the case may be. At all events the avenger, so dear to the Indian, survives. Each rancho has a distinct name. Besides, every Indian who is anybody has several ranchos spread over the country. To collect the names of the ranchos would be paramount to taking a census of the territory. The following are well-known ranchos, with usually some half-caste from Riohacha trading with the Indians. In the Macuira range, six miles from Punta Espada, is Guarerpá, at the foot of Ara-ura; chief, Caijuna, a Jirnu. Westwards, close to the sea-shore, Chémunao; chief, José Agustín, a Jallariú, a half-caste speaking good Spanish. At the foot of Itujoro, Maguaipá, situated on a slight eminence eight miles from the sea, and is an important trading station. Paraliero, native name of Puerto Estrella, boasts twelve houses and three iron warehouses, with always two or three Riohacheros resident there. The chief, Pedro Quinto, is Epieyu, but his sister Mauricia is the virtual ruler. Inland, 16 miles from Bahía Honda or Taroa is Merunay, another large trading station, usually with two or three Riohacheros established there. The eight ranchos are well located on a plain between Macuira and Parashi. The chief, Saipa, is Epieyu. This is one of the most central stations in the Goajira, and is surrounded by several important places; it is probably

the site of the old Spanish settlement San Juan de Ipapa. On the west side of the Parashi Hills in the plains is another well-known central trading station Joroy; chief, Majuté, an Ipuana; probably near the old site of the Spanish settlement Moscote. In the neighbourhood are: Guarirpanturi; chief, Concón, an Ipuana. A Dutchman from Aruba has lived here many years, and has become quite an Indian. Aipiapé, a few ranchos on an eminence, commanding the whole valley. The Indians here are rather mixed, but the chief is a Pushaina. The well Kapaulera, at the base of the hill, is the finest I saw, and surrounded with rich green vegetation similar to that of Macuira. Katunasíó, the most inland station. It is generally the traders that make a rancho known, for the Indians do everything they can to keep their abodes, if not secret, at any rate as much in the dark as possible. The plains being more unsettled than the mountain district, traders do not venture to establish themselves in the interior, as at Merunay or Joroy, so few ranchos are known. The most important place in the Lower Goajira is Guincua, midway between Riohacha and the Venezuelan town of Las Guardias or Santa Teresa. Paraguaipoa, the new Venezuelan military colony, founded in 1882, counts already 50 houses. It is situated in the plains 12 miles in advance of Santa Teresa, which it completely covers. The garrison at present consists of 30 men, well mounted and found in every respect, under the orders of a commander, two secretaries, and two interpreters; the latter for the purpose of taking statistics as to trade, &c. Altogether it is a model establishment, and does honour to the Government of Venezuela. The entire population of the Goajira may be about 20,000; it does not exceed 25,000, and is not increasing.

As regards manners and customs and the way they enforce their old peculiar laws, these Goajiros are particularly interesting. Of course, like all Indians, they are singularly proficient in begging, stealing, and drinking, but besides these capital vices they add a fourth, that is demanding compensation, tear- or blood-money—principal cause of all the strife and blood feuds between the castes, and an everlasting danger to Indians and strangers alike. Whereas about one-quarter of the male population die a violent death from its result, another quarter are killed by drink and its effects. The laws that govern these compensation cases are very intricate, their number is legion. First is the terrible law of retribution, that makes a whole caste responsible for the acts of any single member. As the Spaniards or white men are considered by the Indians as belonging to one large family, the country is very unsafe for travelling, for every white man is a sort of hostage for the good behaviour of the others. If an Indian should be killed in a quarrel by a white man, the life of another white man, living leagues away, depends upon whether the foe (relations of the dead Indian) or a friend brings the news first. Many an innocent unconscious trader has been sacrificed at one end of the peninsula for a foul murder committed at the other end.

In the following laws it must be borne in mind that it is not the injured individual that demands compensation, but his relations, uncles on the mother's side as a rule. From this has arisen the common error that the father is ignored; as will be seen further on, this is not the case. In compensation it is the caste that reclaims, and the caste is always the mother's side. For example, a Pushaina man marries an Uriana girl; the children are Urianas. If one of these now should kill an Epieyu, for example, the whole caste of Uriana is at war with all the Epieyues, unless the matter is amicably settled by paying blood-money.

Case No. 1. Personally inflicted wounds. If an Indian accidentally cuts himself, say with his own knife, breaks a limb, or otherwise does himself an injury, his family on the mother's side immediately demands blood-money. Being of their blood, he is not allowed to spill it without paying for it. The father's relations demand tear-money, not so much. Friends present demand compensation to repay their sorrow at seeing a friend in pain. If anybody present can seize the instrument that caused the accident it is appropriated. The pay is in ratio to the injury. A slightly cut finger is settled with a little Indian corn, a kid, or such trifle. A bad cut requires at least a goat or a sheep, with other sundries. In all cases of compensation where the Indian has not the wherewith to satisfy his creditors, he goes round begging until it is obtained.

Case No. 2. Damage done by animals. Suppose an Indian borrows a mule or other animal, and is thrown by it, doing himself bodily injury, then his relations demand compensation from the lender, the argument being, had he not lent the animal the accident could not have happened. Should the beast belong to the thrown man himself, then he has to pay. Case of No. 1 in fact.

Case No. 3. General liability all round. This covers an enormous field. The most curious. Everybody selling rum or anything else is answerable for all the damage done by its instrumentality. Unfortunately this law is only, like many others, enforced when it is possible. As the traders know it very well, they never take rum into the interior for barter without being fully able to protect themselves. I was lent a servant as guide by a trader, who requested me not to let the man have any drink, for should anything happen to him he would be responsible to the family. Indians in employment receiving any damage the employer becomes liable; and so on. Wherever the Indian can only make the ghost of a claim he wants tear-money, blood-money, or some other money, and if not satisfied, helps himself with what he can lay his hands on.

Case No. 4. Mentioning names. This is very serious. The Indians object to have their true names mentioned, and demand heavy compensation in aggravated cases. They generally go by a Spanish name—José Antonio, Agustin, Vicente, &c., for an Indian dearly loves to be baptised, that is, he likes the attending feast and having god-fathers on

whom to exercise his begging propensities. To mention the dead before the relations is a dreadful offence, often punished by death; for if it happens in the dead person's rancho, with nephew or uncle present, they will assuredly kill the offender on the spot if possible. If not on the spur of the moment, it resolves itself into a heavy fine, usually two or more oxen. Even if none of the dead person's relations are present, any friend can carry the news to the relations, and compensation is at once required. When not given it is forcibly taken, probably resented, and the two castes are at war. It is not wise to mention names of any sort in the Goajira in mixed company.

Another peculiar case: if a child dies in the custody of the mother or father, and they are living separate at the time of its death, then tear-money has to be paid by the one, under whose care the child died, to the other. This is "*Taguira suchírua tachón*," "My tears on account of my child." To demand payment for debts, *achecaha*, is one thing, and to demand compensation, *manya*, is another. They are generally pretty punctual in paying debts; should the debtor die, the creditor is secure, for the relations will suffer anything rather than allow the name of their dead to be abused. The following case of murder I witnessed in Ataipa. Some Pushainas drinking, one got on to a strange horse, and was ordered off by the owner, on not complying he was shot dead. Both parties being poor and near relations, it was arranged as follows: First payment, eight sheep, two oxen, one horse, two necklaces of cornelian beads, two sirapos of black beads (about 16 lbs.). Six months afterwards, second payment, similar to first. A few months after a third payment is asked, but is more an extra than anything else. After second payment all animosity ceases, and the two families can look again at each other on meeting. Should an Indian in attempting to kill another be wounded or killed, his family demand the same as though no attempt were made.

Among domestic customs, the one that calls most attention is shutting up their young girls on arriving at womanhood. The custom is religiously carried out throughout the country. Each girl is enclosed in a separate little hut by herself. She is stripped of all her ornaments, even to her beads and sirapo, and all her clothing with the exception of the long loose cotton gown, nor is she allowed to cut her hair. For the first couple of days, drinking water is denied her, the only food being *haguape*, a composition of medicinal herbs. According to birth, a rigorous diet is observed the first month, no meat being allowed. She can be freely mentioned and is merely alluded to by her relations as "*surtise suru paura*," "she is shut up in her house." The term of retirement varies according to the wealth and rank of her family. Poor people cannot afford to keep girls idle more than a couple of weeks or a month; whereas the rich enclose them for one, two, or even four years. It is while in this state that she learns all women's requirements—

weaving, making dresses, hammocks, sashes, &c., sewing, and all the little knick-knacks Indians love so well.

The confinement is not so isolated as it seems, generally several of her female relations are round the door with the enclosed, who of course becomes rather stout, much blanched, almost white, and some exceedingly beautiful. Strangers and men are not excluded from peeping in through the door, always with an eye to matrimony, and she can be sold and liberated at once, though her husband if rich prefers leaving her to complete her term of schooling. On re-entering to society again, a special festival, *ahuitis*, is held with dancing, &c. An ox is killed, and the girl is dressed in the clothes she has made; her hair is cut and she resumes all her beads, necklaces, bracelets, and other ornaments.

Women are much respected by the Goajiros. In a quarrel or drunken brawl, women often save bloodshed by stepping in and tearing the weapons out of their husband's or brother's hand. Travelling with women is consequently perfectly safe, and in case of danger, if one undertakes to protect a stranger, he may rely upon coming out all right.

Matrimony is a mere case of barter. The girl is sold for a certain price, fixed by the father. This is paid by the intended husband, and divided by the father, who appropriates the best part for himself and his relations, the rest going to the wife's relations. As it is chiefly in cattle, these are killed and a kind of bridal festival held. There is no other ceremony. A wife is under obligation to support her husband, find him in food, clothes, &c. She does most of the trading, and a contract made with an Indian is worthless, should his better half object. An Indian cannot inflict bodily injury on his wife, for he becomes liable to her relations, and should she die during childbirth he has to repay the father what he gave for her. But if the wife is untrue (a rare occurrence) he demands from the father the price he paid for her, who if he cannot refund, helps him to recover from the seducer, plus tear or compensation from his mother-in-law. At the husband's death, the wife becomes a legacy to his brother, usually the youngest; if there are none, then his nephew inherits her. The daughter of a chief is worth, according to his wealth and power (i. e. the number of men he can dispose of in a fight) from 6 to 150 head of cattle (12*l.* to 300*l.*).

When a person dies, a grand drinking festival is given, that lasts as long as there is anything to drink—days, and even weeks, with the wealthy. These latter are buried twice, and have two festivals. A rich person is always buried in the rancho, and on the spot where he was born; being often carried for that purpose immense distances. A fire is lighted every night from sunset to sunrise in front of the grave, for the sole use of the dead. Immense piles of wood are gathered for this purpose, as the body is kept two years in the house. Then all the relations can meet on a certain day, and the second feast takes place, when the bones are carefully gathered, placed in a jar, and consigned to the

cemetery, a site chosen in some solitary arid spot, and surrounded by walls of cacti. At the death of Salvador, a Pushaina from Arroyo Cardon, 120 fat oxen were killed, and the hides did not pay for the liquor drunk. Two of the same family meeting for the first time after the death of a relation, must squat down on their hands in front of each other, and sob and weep, for at least a quarter of an hour, the louder the better.

The Indians are very punctilious in saluting. Calling at a rancho, visitors must wait until spoken to, if this is not done soon, it is evident they are not welcome, so ride away. The words used never seem to be the same. The most frequent are "Intishi-pia" (you have come), or "Eiguare pia" (so you have arrived). In eating and drinking the Indians are extremely cleanly. The principals all eat separately; receiving their allowance in an earthenware dish, *posú*, with a gourd spoon, *pushá*. The remains, with an addition, serve for the lower members of the family. Water is invariably given after, to wash the mouth and fingers. Even if a drink of milk is taken, a little water is tendered after. As to their hospitality, it has, I believe, been rather exaggerated. There is no doubt that the Goajiro is more hospitable than the Arhuaco of the Sierra Nevada, but then he is also far more cunning and diplomatic, and his hospitality is a mere question of self-interest. He will willingly give a sheep or a goat as a present, provided there is a chance of claiming an ox in return. He is chivalresque in his donations. When he does give a sheep, it is a fat one, his best, and given whole, without reserve, skin and all. If eating, on the arrival of a stranger, he may offer food to him, but certainly will give if requested, as is the custom, always begging. One thing a guest may rely upon receiving in a rancho is a hammock, even if the owner has to sleep on the ground. Lastly, among curious customs, is that of parents assuming the names of their children with the prefix *nushi* or *sushi* if the father, and *ni* or *si* if the mother. Thus the father of Juan would call himself "Nushijuan," or if a daughter, "Sushijuana." The mother of Juan would be called "Nijuan," and if a daughter, "Sijuana."

The dress of the Goajiros is extremely simple, and probably similar to his savage luxury of three centuries ago, when Alfínger devastated the land, except that his own quiet blacks and browns—for he is cunning in the art of dyeing—have given way to the gorgeous blues, reds, and yellows of European wool. His every day working costume is simply a strip of cloth from three inches wide upwards, called *caiches*. When paying visits, receiving company, or travelling, he dons his best—a large loincloth with many folds, and the home-woven mantle *shé*, with a magnificent sash, *si-ira*. The mantle is managed with wonderful elegance, now letting it fall about him in voluptuous folds, or dropping it from his shoulders, and tucking it into his immense sash, where his arrows are carried. The hair, which is jet black, thick, and cut short, is kept back in a very æsthetic style by a ring or crown,

called *yara* if made of plaited straw, and *capanase* if made of wool, with large tassel (worn behind). The two can be combined and adorned with a couple of feathers in front. When made entirely of feathers, it becomes *toróma*. An Indian's toilet would not be complete without a *hapiquito*, a piece of leather fastened round the left wrist by a twist of wool to receive the recoil of the bow-string when shooting. Paint is common to both sexes, and in excess. They assert that it saves their complexions from the sun. The last thing an Indian does, on mounting horse for the day's journey, is to call for the powder-box, and plentifully besprinkle his face. The powders *mapuatepo* or *marua* are rotten wood; *guanapai*, a black stain from a wild nut; and *parisa*, very popular among the fairer sex, is the colour extracted from a leaf and mixed with fat.

The woman's dress is invariably, at present, made from foreign cotton, and is a plain sack with a hole for the head and two others for the arms. With the wind it blows out and makes her look like a balloon. The white cotton is dyed black with *divi-divi*, or yellowish-brown with *mora* (yellow wood), or reddish-brown with the suckers of mangroves. The Indians are exceptionally clean and nice in their dress, and, however poor, keep a reserve suit for state occasions. Women alone wear the *púna* and the *sirapo*. The *púna* are like a pair of braces; long strings of beads passing over each shoulder to cross each other on the breast and back, held in position at the waist by the *sirapo*, a sort of sash or belt made of beads likewise. Small strings a few ounces in weight are placed on the female child a few months after birth, and gradually increased, according to the strength of the child and the purse of the parents. *Púnas* are made with any beads except black, a red variety with white eye (*isochón*) preferred, and weigh from 2 to 10 lbs. With *sirapos* any coloured bead will do, *piaur* or black ones the rule, and they weigh from 1 to 10 lbs. A married woman may wear the *púna* until her first confinement, when it is laid aside. Poor Indians who cannot afford beads for the *púna* make it of cotton dyed black and braided. Among the many necklaces, *tumas* are the most valuable. These curious perforated stones are only found in the graves of prehistoric races, both in the peninsula itself and the Sierra Nevada. There are many varieties. The round ones varying in size from a large marble to a pea are *túma* (a name generalised by the Spaniards); those in shape of small charm-barrels are *amururé*; the pear-shaped, according as they are long or dumpy, *perinya*, and *guarirainya*; the bugle is *parauria*, &c. Mineralogically they are bits of red jasper, cornelian, and reddish sardonyx. Their value depends upon the intensity of red and size. A large one at present is worth a head of cattle; a necklace has from 15 to 30, varying in size. Bracelets are as varied and in as much profusion as necklaces; they are called *hápuna*, from *ahapo*, the hand. On the feet they also wear strings of cornelians and beads. They have two names, the aristocratic *cushihanár* and the common *guaurihena*.

In weapons the Goajiro uses the old-fashioned bow and arrow, along with the latest breech-loading rifle. He never strolls ten yards from the rancho without his arrows stuck in his sash and the inseparable bow in his hand. Arrows are of three classes: bolts for killing birds and lizards, *hatu*, having a nail or piece of hard wood for a head neatly covered with wax; arrows proper, for killing game and war, *siguarrai*, with iron heads made from old knives filed and worked into shape; and thirdly the terrible poisoned rays, *aimará*: these are an ordinary arrow-shaft, with two inches of the bony weapon of the sting-ray (*queraguaí*) loosely fastened to the end, well covered with poison. To prevent accidents, each head is covered by a cane sheath. The poison is putrefied animal matter—toads, snakes, and other reptiles allowed to putrefy and boiled down. When newly done the poison is said to be weak, the same when too old, so the arrows have to be re-dipped at stated intervals (about nine months). Death subvenes from three to twelve days afterwards, a sort of blood-poisoning, and is tolerably certain, if the ray-bone has not been got out (a most difficult operation) and the wound well cauterised with a red-hot nail. The Cocinas of Yuripiche are reputed the best makers, and enjoy a sort of monopoly. A bunch of twenty-four arrows is sold by them for a dress cut of cotton (eight yards). None of the arrows are feathered; the shafts are made from cane, reeds, and also solid wood. As to firearms the Indian prefers the old "Crown" or "Tower" flintlock (*carcabuso*) to the Remington rifle, on account of the uncertainty of getting cartridges. The American flintlock (*carcabuso cayeta-punahana*) is also much liked.

The principal industries among the Goajiras are collecting brazileto, divi-divi, and salt, and breeding horses, mules, donkeys, cattle, and goats, with the accompanying sale of hides. Their animals are celebrated in the neighbouring provinces for being docile, having been all brought up as it were by hand, for the Indian spares neither time nor trouble on his flocks.

With regard to the language, a small grammar was published in 1878 by Rafael Caledon. Unfortunately it was printed in Paris, while the author was in America, and is replete with errors in consequence. The language is a much richer one than is generally supposed, and taken as a whole has a euphonious, pleasing effect on the ear, much more so than the neighbouring Arhuaco. I have no space here to dwell upon its beauties, but cannot dismiss the subject without giving the following three examples of much-used words:—

Achinga, a name.	Ita, a cup (gourd).	Yara, a headdress.
Tachinga, my name.	Te-ita-in, my cup.	Tekiyara, my headdress.
Puchinga, your name.	Pi-ita-in, your cup.	Pikiyara, your headdress.
Nichinga, his name.	Ni-ita-in, his cup.	Nikiyara, his headdress.
Nuchinga, her name.	Si-ita-in, her cup.	Sikiyara, her headdress.

As a last word I may say from personal experience that the Goajira is an interesting but not a beautiful country, nor is it a desirable place for travelling, either for pleasure or for commerce. Not that there is any actual danger under ordinary circumstances, but what between drunken bloodthirsty Indians, blood- and tear-money, with all the intricacies of their own peculiar laws, travelling among them is as bad as sitting on a keg of gunpowder before a big fire. It is impossible to foretell when a mere spark, accidentally or intentionally, may blow the whole thing up.

APPENDIX.

List of Tribes or Castes, with their respective animals and favourite resting-places.

Uriana	..	Canahapur	Tiger	..	..	About Taroa and Bahía Honda.
"	..	Arpaná	Rabbit	..	..	About Cuce and Maracaybo coast.
"	..	Guinpirai	A singing bird	..		Everywhere.
"	..	Hokóriu	Gecko (lizard)	..		Only in the plains.
Epíeyú	..	Guarusecho	A species of vulture			Bahía Honda, Puerto Estr. lls, and plains.
Pushaina	..	Puiche	A species of small peccary.			Parashí, Ataiapa, and plains.
Ipuana	..	Musharé	A sort of hawk	..		Portete Joroy, Ciapana, &c.
Jayariú	..	Er	Dog	..	..	Macuira and plains.
Jusayú	..	Kasiaurie	Rat-snake	..	..	Teta, Hayare.
Arpushaina	..	Samur	Vulture	..	..	Guinea and plains, Cohoro.
Sapuana	..	Garina	Hen	..	..	Plains, Guarero.
"	..	Cárrai	A species of stork	..		(?)
Epínayú	..	Uyára	A small buck	..		Portete, Hayarure.
Jirnu or Piesí	..	Guarir	Fox	..	..	Only in the Macuira valley.
Secuana	..	Güorgüor or Guarusecho.	Species of vulture	..		Only in the Upper Goajira.
Urariyú	..	Mára	Rattlesnake	..	..	Everywhere.
Pausayú	..	Huche	(?)			(?)
Sijuana	..	Cóori	Wasp	..	..	Upper Goajira only.
Guarirín	..	Guarir	Fox	..	..	Only in the hills of Macuira.
Guñúriu or Guau-uríu.	..	Per	Partridge	..	..	Taroa and Upper Goajira.
Arapainayú	..	Anuwana	Species of vulture	..		Upper Goajira only.
Samuriú	..	Hepépa	Owl	..	..	" "
Arpu-iata	..	Ischú	Red cardinal bird	..		" "
Ucharaiú	..	Are all Cocina Indians		..	..	Cohoro hills only.
Araurujuna	..	A small, almost unknown tribe				in the hills of Macuira.
Güorgüoriyú	..	Güorgüor or Guarusecho.	Species of vulture			Only in the hills of Upper Goajira.

N.B.—The Samuriúes, a very small caste, eat horseflesh and donkeys. This is considered by the other Indians to be very unclean, who, until lately, did not even eat swine. All Indians are, however, fond of a species of lizard, "guasher," and iguanas.

Report on Admiralty Surveys for the Year 1884.

By the Hydrographer, Captain W. J. L. WHARTON, R.N.*

On the 31st of July, 1884, Captain Sir F. J. Evans retired from the post of Hydrographer of the Admiralty, which he had held since 3rd February, 1874, and after a continuous service in the Hydrographic Department of the Admiralty of nearly thirty years. The loss of his knowledge and experience is much felt in the department with which he was so long connected.

During 1884 the undermentioned Hydrographical Surveys were in progress in Her Majesty's ships of war and other vessels :—

SURVEY.	SHIPS.	Horse Power (Indicated).	Tonnage. (Weight in Tons.)	Officers and Men.
HOME.				
East Coasts of England and Scotland.	H.M. Ship <i>Triton</i>	370	410	40
West Coast of England ..	Hired steam vessel <i>Knight Errant</i>.	..	..	27
FOREIGN.				
Newfoundland : South Coast	Hired steam-vessel <i>Gulnare</i>	..	..	37
West Indies : Little Bahama Bank ..	H.M. sailing schooner <i>Sparrowhawk</i> .	..	86	25
Magellan Strait : and Africa (South-east Coast)	H.M. Ship <i>Sylvia</i>	690	865	111
Red Sea : Sawakin approaches ..	H.M. Ship <i>Myrmidon</i> ..	720	877	113
Malay Peninsular : West Coast [Paid out of Commission July 1884.]	H.M. Ship <i>Muggie</i>	600	805	106
China : Hai-tan Strait and Korea, West Coast ..	H.M. Ship <i>Flying Fish</i> ..	840	940	113
Australia : North-west Coast ..	Sailing schooner <i>Meda</i> ..	..	180	21
Western Pacific Ocean : Solomon Islands	H.M. sailing schooner <i>Lark</i>	..	180	35

The number of officers of all ranks employed in the several vessels named, amounted to sixty-seven [of which thirty-nine are surveying officers], and their crews to 561.

Coasts of the United Kingdom.—The *Triton*, under Staff-Commander Tizard, commenced operations the middle of April, in the estuary of the Thames, re-sounding the southern portion of the river-bed between the Nore and western entrance of the Alexandra channel; this included a thorough examination of the numerous shoal flats last surveyed in 1862-63.

* From the Parliamentary Report, c.—4401, 1885.

Early in June, in consequence of comparatively shoal ground being reported 65 miles south-westward of Ushant, in the direct route of steam shipping making Ushant from the southward, the *Triton* was ordered to take soundings in the locality, for the purpose of verifying or contradicting the report. Although an area of 400 square miles was carefully sounded over, there was no indication of the reported bank.

On completion of this work, the vessel proceeded to the East Coast of England to undertake a re-survey of the Leman, Ower, Inner, and Well banks fronting the shores of Norfolk, 23 to 30 miles from the coast.

The month of July was devoted to this examination, which disclosed considerable alteration in these dangers since the last survey in 1844.

Early in August the *Triton* proceeded to the East Coast of Scotland, where the survey of Montrose harbour (in continuation of the work commenced during the latter part of the season of 1883) was completed. Lunan bay and Arbroath harbour were also charted in detail.

Returning southward in September, Hartlepool bay and harbour were closely surveyed on a large scale.

West Coast of England.—Staff-Commander Archdeacon, with two assistants, in the hired steam-vessel *Knight Errant*, have re-sounded, on the coast of Lancashire, the whole of Morecambe bay, including the entrances to the Lune and Wyre rivers, a survey urgently needed, from the great changes that had taken place in the depths during a period of thirteen years.

In the Bristol Channel, a small portion of Swansea bay, south of Port Talbot, was re-surveyed, to complete the chart of that bay commenced in 1883.

The surveying party next took up the re-examination of that important part of the Bristol Channel from Breaksea point towards the Holms, with approaches to Bridgewater.

In this main navigable highway, Culver sand, one of the most dangerous in the channel, was closely examined; as also One Fathom bank, together with the adjacent ledges and shoals immediately in the fairway of vessels bound to Cardiff. Fair progress was also made in the survey of Bridgewater bay and port. The great range of tide and velocity of stream (the latter causing heavy rips in the vicinity of banks and shoals), together with an almost constant haze in the channel, rendered the work of the surveyors both hazardous and tedious.

Newfoundland.—On the southern shores of Newfoundland, Staff-Commander Maxwell, with two assistants, in the hired steam-vessel *Gulnare*, have been actively employed in surveying the coast from Laun islands to Fortune head; also Despair bay, and the shore from thence westward to Red head.

Plans of Lamelin harbour and road, and of Great Jervis harbour were made, and the deep-water area of Fortune and Hermitage bays sounded over.

From the unusual amount of fog prevailing, the survey of the exposed portion of this coast was even more dangerous than usual.

West Indies, Little Bahama Bank.—The sailing schooner *Sparrowhawk*, under Lieutenant and Commander White, has been steadily engaged in advancing the survey of Little Bahama Bank, in continuation of the portion which had been previously accomplished by this officer and his staff since 1881.

On the completion of that part of the bank between Pensacola Cay and Walker Cay, the *Sparrowhawk* took up the survey of the eastern and southern seaboard of Great Abaco island, where the shore-line from Elbow Cay lighthouse to Cedar point, with the soundings inside the outer reefs, are reported to be completed.

Mugellan Strait; and Africa, South-East Coast.—As mentioned in the report on Admiralty surveys for 1883, the *Sylvia* (then under my command) was, at the

end of that year, surveying the shores of Magellan Strait from Cape Gallant, eastward to Sandy Point.

Owing to the comparatively fine weather in the eastern part of the strait, I was able, with the zealous co-operation of my assistants, to complete, by the latter part of February, the survey of the whole portion above-mentioned, 80 miles in length; together with plans of the anchorages at Snug bay, Carrera bay, and Porvenir bay.

The *Sylvia's* survey may be said to complete the charting of the important route by the main Strait of Magellan, commenced in 1865 by Captain Mayne, R.N.

Monte Video was reached early in March, and, after a short stay, the ship sailed for the Cape of Good Hope, under the temporary command of Lieutenant H. H. Dyke, whilst I proceeded to England, by their Lordship's directions.

Captain Pelham Aldrich joined the *Sylvia* in May, and early in July, after a thorough refit, the vessel left Simon's Bay to resume operations on the south-east coast of Africa.

On passage to Port Natal, a short time was spent on the examination of the offing at Riet point [73 miles eastward of Port Elizabeth], where the dangers were said to extend farther from the coast than depicted on the Admiralty charts; this cursory examination verified the accuracy of the Admiralty publications.

From thence, the *Sylvia* proceeded to Port Natal, and then made an exhaustive survey of Aliwal shoal and vicinity.

This was undertaken in consequence of reports received from the masters of steamers as to the misplacement of the shoal on the Admiralty charts, and of another danger existing in its vicinity.

This examination proved the absolute accuracy of the former survey of this formidable danger, by Mr. Skead, R.N., in 1859, and the non-existence of any other neighbouring bank.

Proceeding to the north-eastward, the sea-board from Cape St. Lucia to Delagoa bay [comprising a distance of 160 miles] which was imperfectly known, next received attention.

Under circumstances of fine weather and with the aid of floating beacons, the shore line was charted by running survey; approaches well sounded over, delineating the 20-fathom line throughout the whole extent.

On completion of this open coast, detailed plans of Inhambane and Chuluwan ports were made, to meet the requirements of navigation. The mail steamers call at both these harbours.

Subsequently, the river Quilimane (also a mail packet station) was surveyed, and a new channel, east of Militao bank leading to Quilimane found. This channel being perfectly straight and having good water throughout, Captain Aldrich considers far preferable to the tortuous and difficult one now used round Hippopotamus point.

On the completion of Quilimane river, the *Sylvia* returned to Chuluwan, and there extended the survey commenced on her first visit by incorporating the dangerous Inverarity or Chuluwan shoal, situated some 10 miles from the coast; also charting the southern entrance to Chuluwan as far as Cape Machanca, the *Sylvia* then proceeded to explore the coast on either side of Inhambane, hitherto but little known.

Northward of Inhambane, the shore line was charted as far as Cape Bazaruto, on an island of that name.

To the south of Inhambane, the survey was carried to Zavora Point. In the prosecution of this survey, the strong current off Cape Corrientes caused considerable difficulty.

In the middle of December, the vessel went to Delagoa bay where, in the northern

part, the channel between the Cutfield flat and the main was explored, as also the shore line from thence northward to Lagoa river.

When completed, it was Captain Aldrich's intention to proceed to Simon's Bay for refit, and to recruit the health of the crew; the insalubrity of the coast having commenced to show itself by cases of fever breaking out amongst officers and men.

The *Sylvia* has largely added to our knowledge of the ports and salient points of this disagreeable coast.

Red Sea, Sawákin Approaches.—H.M.S. *Myrmidon* was commissioned in January by Commander A. Carpenter, and left England the following month for surveying operations in the Red Sea.

Whilst at Malta an examination was made of the soundings off St. Elmo Point at the entrance to Grand Harbour, owing to shoaler depths than marked on the chart having been found to exist.

After rating the chronometers at Suez, the *Myrmidon* sailed for Sawákin; on passage thence, assisted to rescue the crew of a French steamer on the reefs in Jubal Strait, and visited the Dædalus shoal lighthouse for the purpose of testing its astronomical position; this was found to be correct.

Sawákin was reached on 30th March, when a plan of the harbour, embracing the positions of the fortifications recently thrown up by our troops, was immediately executed; a work somewhat hampered by the hostility of the natives.

A comprehensive survey of the seaward approaches to Sawákin through the numberless coral reefs—extending off the coast for 40 miles to the north and 34 miles to the south—was then undertaken, and on the 7th of August was completed. Buoys marking the best channels through the reefs were also laid down.

The successful accomplishment of this work, under considerable difficulties of climate and adverse conditions of survey, reflect great credit on the energy of Commander Carpenter and his officers.

During the prosecution of this survey the *Myrmidon* constantly returned to Sawákin, and there assisted in repelling the harassing night attacks on the lines.

The *Myrmidon* then proceeded to Suez, stopping a short time to take a plan of what is presumed to be the ancient classical port of Berenice.

In October Commander R. F. Hoskyn relieved Commander Carpenter in command of the vessel, the latter officer having been appointed in charge of the Marine Survey of India.

Early in November, the *Myrmidon* sailed for the southern part of the Red Sea to complete the survey of the channels through the Hanish and other islands, commenced by Commodore Aldrich in 1881.

Commander Hoskyn continued to struggle against the strong wind that prevails until the middle of December, when, in accordance with orders, he proceeded for Zeila to make a plan of that port.

Malay Peninsula, West Coast.—H.M.S. *Magpie*, under the command of Commander the Hon. Foley C. P. Vereker, in the early months of the year made an examination of the outer groups of islands lying between Penang and Sayer islands. These islands are now well charted, and their astronomical positions correctly determined; a work of value, as the main route to China runs by their shores, and the charts were but imperfect.

Bass harbour, formed by Pulo Lancava and the islands off its southern shore, proved to be an excellent and commodious port, with a large native population living in the vicinity.

Deep soundings on the seaward side of those islands now clearly mark the nature of the approach to them.

The survey of the anchorage and inner waters of Penang were commenced, and,

at the request of the Colonial Office, two officers [Lieutenants Belam and Douglas] were selected from H.M.S. *Magpie*, on her being ordered home, to complete the survey of Penang, and then proceed to examine the ports and rivers of the protected native states.

In March, the *Magpie* left Penang for Singapore, to be docked and for necessary repairs, preparatory to making the voyage to England, via Suez Canal.

Diego Garcia, an island rising in importance from the recent establishment of coal depôts, was visited, and notes made for a future detailed survey.

The vessel arrived at Devonport the latter end of June, when she was put out of commission, having been actively employed as a surveying vessel on various parts of the China station for a period of five years.

[Commander Vereker in November was appointed by their Lordships to commission H.M.S. *Rambler*, at Chatham, for surveying service on the coasts of China, that vessel having been selected to replace the *Magpie*.]

Malacca Strait.—Lieutenants Belam and Douglas, under the direction of the Straits Settlement Government, and with their assistance, finished the survey of Penang inner waters, commenced by Commander Vereker, and in July proceeded to Port Weld, the seaport of Taiping, and principal mining town of Perak province.

Here the inner approaches to Port Weld from Slinsing bay and Laroot estuary were minutely charted, and a plan on a large scale of the port executed for harbour purposes.

As the depth on the bars of the rivers leading to Port Weld is but 12 feet at high-water springs, the port is only available for small coasting vessels.

This examination occupied till December, when the surveying party left for the Perak River, and there commenced an examination of the shallows fronting this navigable stream.

Hai-tan Strait, China. West Coast of Korea.—Early in February the *Flying Fish*, under Captain Maclear, sailed for Hong-Kong, for surveying operations on the coasts of China and on the western seaboard of the Korean peninsula.

Work was commenced in the vicinity of Amoy by an examination of Quemoy spit, outer extremity.

From thence the vessel went to Hai-tan strait, where, during the months of March and April, a survey was made of its southern approaches, over an area extending from Hai-tan point on the north-east to Lam-yit island on the south-west; this embraced the numerous small islets and isolated dangers that surround the southern entrance into Hai-tan strait—a channel now frequently used by steam-vessels during the north-east monsoon.

Stormy and foggy weather rather seriously impeded this work.

Captain Maclear remarks that the coast fishermen, though at first shy, soon acquired confidence, and supplied the ship with fish and vegetables.

In May the *Flying Fish* proceeded to Japan, and from there to the Korea.

Arriving at Chemulpo, the treaty port near Séoul the capital, Captain Maclear applied to the Korean Government, through Her Majesty's representative, for permission to survey their shores; this was cordially granted, and a passport given to the ship for every assistance and protection to be rendered by the local authorities.

Surveying operations were immediately commenced in shore of Clifford Islands [where Lieutenant Hoskyn's Salée River survey terminated the previous year], and extended southward along the western shores of the Korean peninsula, as far as Washington gulf, a distance of about 140 miles, the astronomical positions of the outermost islands, as determined by Lieutenant Hoskyn, forming the groundwork for connecting the inner islands and coast.

Captain Maclear has reported to me that he has made a sketch survey of the

Archipelago of islands in this hitherto uncharted region; also, that he was able to trace the main coast of Korea throughout the whole distance, with the exception of that part between the parallels of $35^{\circ} 15'$ and $34^{\circ} 50'$ north latitude, where the extensive sand banks and mud flats prevented the vessel from approaching near the shore.

Resulting from this examination, the roadstead of Chu-ying, or Basil bay, was found free from dangers and easy of access; but the adjacent river, Keum Gang, has a shallow bar, allowing only junks and light-draught vessels to cross. [This river was surveyed by the boats of the United States steam-vessel *Alert*, who carried deep water up the river for 30 miles.]

A safe commodious harbour was found on the mainland at Mokpo, in latitude $34^{\circ} 47' N.$, longitude $126^{\circ} 23' E.$, at the entrance to the river Yen San Gang. From Mokpo, which is a large native town, the river was traced 20 miles, carrying a depth in the channel of from 8 to 12 fathoms; it then passed between the outer range of hills, and forked into two branches, north and east, through low land covered with hummocks; the eastern branch was seen to traverse as far as a high range of mountains 10 miles distant, and appeared navigable.

Whilst in Korean waters, that part of the coast situated between Tsia-tung Islands [the western limit of Lieutenant Hoskyn's Séoul River survey] and Sir James Hall group, was likewise examined and delineated, with sufficient detail for the present requirements of navigation. A good harbour, (Rooper harbour), was here found to exist at the entrance of a river, in latitude $37^{\circ} 45' N.$, longitude $125^{\circ} 20' E.$, which may prove of future importance on account of its proximity to the large city of Hai-ju.

During the prosecution of the survey, the Koreans on the coast were very civil, courteous, and honest, often helping surveying parties; but their inquisitiveness was rather trying.

Captain Maclear remarks that there is no trade to speak of, but the country is fairly cultivated [with rice, beans, turnips, sweet-potatoes, cotton, and tobacco], each district easily supply the wants of its inhabitants.

The survey of the Korean shores was frequently interrupted by stormy weather.

The *Flying Fish* concluded her work in the Korea the latter part of October, when she left for Nagasaki, and after a short stay proceeded to Hong-Kong to refit, preparatory to future operations in the Eastern Archipelago, particularly in the main routes between China and the Australian Colonies.

Australia, North-west Coast.—The surveying schooner *Meda*, under Staff-Commander Coghlan, sailed from Freemantle the middle of April, for the north-west shores of the Colony.

During the passage, deep-sea soundings were taken as opportunities offered, with a view of further defining the bank of coast soundings.

At Shark bay, additional information was obtained, and the limits of the shoal ground to the southward of Gascoyne river approximately determined.

From Shark bay, northward, a running survey was made of about 70 miles of coast, in parts between Charles and Cloates points.

Arriving at Hampton harbour in May, a detailed plan of the harbour, including the approach by Mermaid strait, was executed.

At the end of June, Staff-Commander Coghlan availed himself of an offer from the owner of the steam yacht *Cushie Doo*, to visit Cambridge gulf, on the north-west coast, for the purpose of making a preliminary examination of the gulf, with a view to future survey and settlement; whilst the *Meda*, in charge of Navigating Lieutenant Dixon, proceeded to the mouth of Fortescue river, and there carefully surveyed Fortescue roads and seaward approaches.

On the completion of this, the vessel left for Fremantle, where she arrived in the middle of September, and was laid up.

Port Denison, at the entrance of the river Irwin, 170 miles north of Fremantle, was surveyed in November by Navigating Lieutenant Dixon.

During Staff-Commander Coghlan's reconnaissance in the *Cushie Doo*, he made several small additions to the charts, explored a large bay west of Cape Talbot, which he named Napier Broome, in compliment to the Governor, and executed a sketch survey of parts of Cambridge gulf, in which considerable changes seem to have taken place since Commander King's survey in 1819. The Ord river was also ascended for some distance.

Cambridge gulf appears to afford a large area of anchorage ground to vessels of heavy draught. The natives showed no hostile feelings.

Western Pacific Ocean.—Her Majesty's sailing-schooner *Lark*, under the command of Lieutenant Oldham, on completion in January, of necessary defects and refit at Auckland harbour, New Zealand, closely re-sounded that harbour, eastward from Stokes Point; a task necessitated by alteration in depths since the last survey in 1855.

Auckland was left on the 20th of March, to resume operations in Bougainville strait, Solomon islands.

On the passage thither, the *Lark* made a search for the Wells reef and Queen of Nations shoal. As no indication of their existence resulted, and other of Her Majesty's ships have failed to find these reported dangers, they have been expunged from the charts.

On reaching the Solomon islands, the survey of the northern part of Bougainville strait was continued in connection with that executed in 1883; this has resulted in accurately charting the strait, with its adjacent shores and archipelagos of islands, some of which were entirely unknown.

Bougainville strait, between Masamasa and Choiseul islands, is 15 miles wide; and although a bank of coral six or seven miles broad, extends across the strait from island to island, the least water found on it was six fathoms; and the navigation of the strait may be considered safe. This passage may prove useful to vessels proceeding to or from China and the Australian Colonies.

Few natives were seen on the small islands visited by the *Lark*, but constant smoke on the main islands denoted the presence of numerous villages, the inhabitants of which are, by the friendly inhabitants of Treasury island, said to be continually at war with one another, and inveterate cannibals.

Every advantage was taken by Mr. H. B. Guppy, surgeon of the *Lark*, during her visits to Treasury island, to make a careful geological survey of it, and an extensive collection of the flora, and of geological specimens, was made by him there, and at the other islands, some of which have been already received and forwarded by the Admiralty to the British Museum.

I regret that Mr. Guppy's voluntary exertions in the cause of scientific exploration have resulted in his being invalidated from the service.

At the latter end of October, the *Lark* sailed from the Solomon islands for Sydney, preparatory to being paid off and re-commissioned; a new crew having left England in November for that purpose, Lieutenant T. F. Pullen being the officer selected to succeed Lieutenant Oldham in charge of this survey.

Under the orders of Commodore Erskine, the *Dart*, commanded by Lieutenant W. U. Moore, an experienced surveyor, has, during the year, accomplished the following hydrographical work in intervals snatched during her voyages as a cruiser.

On the east coast of Tasmania early in the year, a detailed survey was executed

of Spring bay, a small but admirable harbour, with its adjacent anchorages and approaches.

In May the *Dart* left Sydney for a protracted cruise amongst the Western Pacific islands; visiting Fiji, Ellice, Gilbert, and Marshall groups, Pleasant island, New Britain; also Treasury island and New Georgia in the Solomon islands; returning to Sydney in October.

Chronometric meridian distances were measured to each place visited, and sketch plans made of the anchorages at Peru and Apamama islands in Gilbert group.

The longitudes obtained during this voyage are of great value.

The *Dart*, in November, was ordered to New Guinea on duties connected exclusively with the establishment of the British Protectorate over the southern shores of that island, when Lieutenant Moore measured careful meridian distances from Sydney to Port Moresby and South Cape (New Guinea) thence to Cooktown and Townsville, on the seaboard of Queensland.

Sub-Lieutenant W. P. Dawson, of this vessel, was appointed by the Commodore acting Lieutenant of the *Miranda* for navigating duties, and whilst in that capacity he accomplished useful hydrographical work amongst the New Hebrides, executing several sketch plans of the anchorages used by the *Miranda*, besides furnishing other remarks for the amendment of Sailing Directions.

India.—Under the orders of the Indian Government, the Marine Survey of British India, in charge of Commander L. S. Dawson, R.N. (with a staff of five officers of the Royal Navy, eight officers of Indian Marine, and two native surveyors), was carried out as heretofore, in the *Investigator*, a paddle-wheel steam-vessel, and by detached boat parties, to the end of April, when the season for active operations on the coast terminates until the fall of the year.

Commander Dawson and assistants in the *Investigator*, charted in detail on the coast of British Burmah, Rangoon river from its embouchure to the town; also the outer approaches, including the entrance of China Bakir river. A plan on a large scale was executed of the bed of Rangoon river fronting the town, embracing from below the Hastings shoal on the east, to above the anchorage for large ships on the west.

Apart from the great changes which had taken place in the main condition of Rangoon river and approaches, this survey ascertained three important points:—

1. That a new and more direct, though not a deep channel across the Hastings shoal had opened out.
2. That the eastern channel into Rangoon river, hitherto unexamined, had a least depth of 21 feet at low-water spring tides, was half a mile wide, and would be, if buoyed, particularly serviceable for vessels bound to or from Maulmein.
3. That the China Bakir river affords an entrance to the Irrawaddy at high water for vessels drawing 15 feet.

On March 19th, the *Investigator* proceeded to Ramree harbour, where an examination was commenced of the neighbouring coast and islands, which was prosecuted until the end of April, when the vessel left for Calcutta, to lay up during the hot summer months.

From the parties detached the following surveys were executed:—

In the Bay of Bengal, south of Ramree harbour, the party, under Lieutenant Channer examined the narrow navigable waters leading respectively to Tangoup and Sandoway; whilst Lieutenant Smyth, on the coast of Madras, made minute plans of Calingapatam and Negapatam.

On the west coast of Hindostan, plans of Mowa [Mahuwa] bay and Shial Bet anchorage, Gulf of Cambay, were accomplished by Navigating Lieutenant Pascoe's party.

After the summer recess, Commander Alfred Carpenter was transferred from the command of H.M.S. *Myrmidon* to take charge of the Indian Marine Survey, vice Commander Dawson.

Commander Carpenter acquaints me that at the end of the year, the survey of Cheduba and Ramree islands, with plans of Cheduba strait narrows and Ramree harbour were completed; also that Lieutenant Smyth was then engaged in making an examination of Tavoy river, on the shores of British Burmah; whilst Lieutenant Heiby was surveying Rajpuri river, on the west coast of Hindostan.

Canada.—Staff-Commander Boulton, in charge of this survey, under the Dominion Government of Canada, informs me that, with the assistance of a graduate from the Royal Military Academy, Kingston, he has, in a small steamer, surveyed the coasts in the vicinity of the main entrance to Georgian bay, Lake Huron, which included a minute examination and charting of all the navigable passages into the bay. This chart was urgently needed in the interests of the large number of vessels now trading to Georgian bay.

Miscellaneous.—From Her Majesty's ships hydrographic information in a variety of forms is frequently received. Among the contributions during 1884 may be specially mentioned,—

Trinkitat harbour, by Navigating Lieutenant Bullmore, of H.M.S. *Carysfort*.

A plan of the port of Berberah, by Lieutenants Johnston and Stuart, of H.M.S.s *Arab* and *Ranger*.

The more frequent visits of ships to the islands of the Pacific has considerably added to the charts, particularly from information forwarded by the officers of the *Espiegle* and *Swinger*.

On the West Coast of Africa a good many changes in the river channels have been notified from the ships of the squadron.

As in former years, a constant interchange of new charts and other documents bearing on hydrography is maintained with the hydrographic departments of other maritime states. This interchange becomes every year more voluminous, as activity in surveying increases. Thus, the Japanese Government now maintains a marine survey of their coasts, from which many additions to our knowledge are received.

Indian and colonial authorities abroad, and port authorities at home, continually supply information.

Amongst them, the accurate surveys of Liverpool bay, by Staff-Commander Graham Hills, and of the estuary of the Tay by Mr. D. Cunningham, c.z., represent a large amount of time and labour.

The soundings obtained by the different submarine telegraph companies are, by their courtesy, constantly utilised for amending and adding to our knowledge of ocean depths.

Remarkable among the results of these soundings, is the further discovery of other small banks to the northward of the Canary Islands rising out of the deep water of the Atlantic.

Summary of the Publications of the Hydrographic Department during the year 1884:—

Charts.—Fifty-five new plates of charts and plans have been engraved and published, and ten plates have been improved by the addition of new plans.

Two thousand five hundred and sixteen corrections have been made to plates by the engraver.

One hundred and seventy plates have been largely improved by corrections and additions.

Thirty-six thousand five hundred charts have received minor corrections at the hands of the draughtsmen.

The number of charts printed for the requirements of the Royal Navy, for Government Departments, and to meet the demands of the general public, has, during 1884, amounted to 237,902.

Notices to Mariners and Hydrographic Notices.—Two hundred and fifty-three Notices to Mariners and twenty-one Hydrographic Notices were published.

[It will be observed that there is a diminution in the number of Hydrographic Notices as compared with former years. This arises from the recent practice, which, to meet the wants of the nautical world, has been adopted, of publishing much information, which hitherto was published in Hydrographic Notices, in the form of "supplements" to the various books of Sailing Directions. These supplements are sold to the public, and are herein classified under the heading of "Books."]

Books.—The following volumes of sailing directions and other hydrographical works have been published:—

1. Bristol Channel, 4th edition: containing sailing directions for that portion of the West Coast of England, including between the Land's End and St. Ann's Head, the western point of entrance to Milford Haven. (Revised edition.)
2. Black Sea Pilot, 3rd edition; comprising directions for the coasts and harbours of the Black Sea and the Sea of Azov. (Revised edition.)
3. Africa Pilot, Part III., 4th edition, with two Appendices: comprises sailing directions for the east coast of Africa, between the Cape of Good Hope and Cape Guardafui, including the islands in Mozambique channel. (Revised edition.)
4. Mauritius, and islands included in its government: containing sailing directions for the island of Mauritius, and the several groups of islands included in its government: also for Réunion. (New work.)
5. China Sea Directory, Vol. III., 2nd edition: contains directions for the coasts of China; including, on the south, Hong-Kong, Canton river, Pratas shoal, the north coast of Luzon, Bashee and Ballintang channels, Formosa and the outlying islands. On the north the Yellow Sea and gulfs of Pe-chili and Liau-tung, to the confines of the Korea. (Revised edition.)
6. Australia Directory, Vol. I., 8th edition: comprising directions for the south and east coasts of Australia, from Cape Leeuwin to Port Jackson; including also Bass strait and Tasmania. (Revised edition.)
7. Supplement, No. 1, to Mediterranean Pilot, Vol. III., 1880: relating to portions of the coasts of Italy, Istria, Dalmatia, Athenia, and Greece.
8. Supplement, No. 1, to west coast of Hindostan Pilot, 2nd edition: relating to portions of the west coast of Hindostan and the south coast of Ceylon.
9. Supplement to Red Sea Pilot, 3rd edition: relating to Sawákin and its approaches, and the Perim harbour.
10. Supplement to China Sea Directory, Vol. I., 2nd edition: relating to Malacca, Singapore, Sunda, Gaspar, and Carimata Straits and to the Java Sea.
11. Supplement to China Sea Directory, Vol. II., 2nd edition: relating to the southern part of the China Sea, north-west coast of Borneo, Gulf of Siam, and to Hainan Island and Strait.
12. Supplement to Australian Directory, Vol. II., 3rd edition: relating to portions of the east coast of Australia, from Port Jackson to Torres Strait, the south coast of New Guinea, and the Louisiade Archipelago.
13. Admiralty catalogue of charts, plans, and sailing directions (the charts amounting to 2670 engraved plates; the sailing directions, with other books, consisting of 86 volumes and pamphlets), with the scale, official number, and price of each chart and book attached, for the year 1884.
14. Tide tables, British and Irish ports, for the year 1885: also the times and heights of high water at full and change, for the principal places over the globe.

15. Admiralty lists of lights throughout the world (5691 lights; of these, 838 are in the British Islands), comprised in 10 pamphlets; corrected to 31st December 1884.

The following 'Sailing Directions' were prepared for publication at the close of 1884:—North Sea Pilot, Part II., 4th edition; North Sea Pilot, Part IV., 4th edition; Scotland—West Coast, Part I., 3rd edition; Scotland—West Coast, Part II., 3rd edition; Ireland—South-east and North Coasts, Part I., 3rd edition; Danish Pilot, 2nd edition; Mediterranean Pilot, Vol. I., 2nd edition; Mediterranean Pilot, Vol. II., 2nd edition; Newfoundland Pilot, Supplement; Nova Scotia, South-east Coast, and Bay of Fundy, 3rd edition; Africa Pilot, Part I., Supplement; Bay of Bengal Pilot (new work); China Sea Directory, Vol. I., 3rd edition; South America Pilot, Part I., 3rd edition; South America Pilot, Part II., 8th edition; Pacific Islands (Western groups), Vol. I. (New work); Pacific Islands (Central groups), Vol. II. (New work); Pacific Islands (Eastern groups), Vol. III. (New work); and Vancouver Island Pilot, 2nd edition.

Letters from Colonel Prejevalsky.

WE are indebted to M. Venukoff for an extract from a Russian journal giving a continuation * of Colonel Prejevalsky's interesting letters on his important expedition in Central Asia. The following relates to his journey between Lob-nor and Khotan †:—

OASIS OF CHIRA, ‡ 80 versts (53 miles) to the west of Khoten.
10th August, 1885.

Having reached, at the end of January, the shores of Lob-nor, we passed nearly two months here, engaged in observing the flight of birds and studying the natives. These last-named received us very heartily and were a hundred times more frank than on the occasion of our first visit to the lake in 1876, when we appeared here in the company of the companions of Yakub-beg of Kashgar.

The people of Lob-nor, whose numbers amount to 400 souls of both sexes, live in reedy enclosures engaged in fishing and snaring wild duck, some in tending cattle, and a few in agriculture, and are under the government of Kunchikan-beg. § This excellent man enjoys the entire love of his subjects, for whose welfare he is as anxious as a natural father. Though he himself has lived in abject poverty ever since the Chinese by various artifices deprived him of his herds and six chests of silver (about 800 roubles) which he had amassed during his long government of Lob-nor. The payments were particularly heavy, so Kunchikan-beg informed us, to obtain the rescission of the order to wear pig-tails. Such a novel custom frightened the Lob-norians so greatly that Kunchikan-beg rode specially to Kurla and gave

* *Vide* 'Proceedings R. G. S.,' *ante*, p. 167.

† Translated by E. Delmar Morgan.

‡ Chira is marked on the map showing Mr. Johnson's routes in 'Journal R. G. S.,' vol. xxxvii. It lies south-west of Ilchi; and about half-way between that place and Kiria.—M.

§ A full account of Lob-nor was presented by me in 1877 to the Geographical Society, and printed in a separate pamphlet under the title of 'From Kulja beyond the Tian Shan to Lob-nor.' To avoid repetition, I will in the present letter confine myself to a brief record of our stay there. [See English edition, 'From Kulja across the Tian Shan to Lob-nor.' Translated by E. Delmar Morgan. London, 1879.—M.]

the Chinese his remaining money, and then could hardly obtain leave that their heads might be shaved as formerly.

Externally the Lob-norians present a mixture of the Mongolian and Turkish races. Their ancestors, who bore the name of *Kavria*, at one time lived in the town of Lob, and extensive ruins of this city may still be seen on the river Jahansaidaria, 80 versts (20 miles) to the south of Lob-nor. At the end of the fourteenth century of our era, the town of Lob was destroyed and its inhabitants exterminated.* Only a small number of them succeeded in saving themselves by hiding in the reeds of Lob-nor where they now dwell; and besides these a few dozen families migrated to the neighbourhood of Keria,† Khotan, and Ak-su. At first the Lob-norians were completely isolated, and only forty years ago, when a Khotan colony was founded at the village of Chargalyk, did they begin by degrees to engage in husbandry and partly to emerge from their state of complete savagery.

The lateness of spring this year delayed the principal flight of water-fowl to Lob-nor. These certainly appeared in small numbers, both duck and swans, by the end of January, but they again disappeared somewhere, perhaps owing to the return of cold weather. But hardly did it become warm, when from the 12th of February an uninterrupted flight began of geese and duck of various kinds. Flock after flock followed one after the other, now flying close to the ground, now high in the clouds; all coming from the south-west, from the neighbourhood of Khotan and Keria. In the meridians of these oases the birds from India can more easily fly across the difficult and cold plateaus of Tibet. The experience of ages has of course taught the winged wanderers that this is the easier, though more circuitous route.

Having reached Lob-nor, the flocks descended swiftly to the ice to rest, while others flew along the lake seeking open water. But of this latter in the middle of February there was but very little, so that the ducks were obliged to keep to the narrow occasional openings in the ice-floes. Here the birds assembled by thousands in each, while small flocks and single birds kept flying over the reeds like flies in every direction. To an ardent sportsman this abundance of game was an interesting sight, particularly as they were little frightened. Our daily sporting excursions were unusually successful; we dragged whole bags full of geese and ducks to camp, and with these supplied all our party with provisions, bestowing what we did not require for ourselves on the Lob-norians.

This fabulous quantity of duck continued at Lob-nor during the whole of the latter half of February. With the first days of March these birds quickly flew away towards the north, so that not a tenth part was left. Meanwhile, others of later kinds began to appear, likewise to follow in the direction of the wide Siberian valleys and summer there.

The warmth of spring began rapidly to increase from the latter half of February, nevertheless the Tarim did not open till the 27th of that month, and Lob-nor was not completely free from ice till the middle of March, when the midday temperature reached + 30° Cels. (86° Fahr.) in the shade. At the same time strong gales began which lasted till June. These violent winds came exclusively from the north-east,

* According to local tradition, the destruction of Lob occurred three years before Toghluks-Timur-Khan accepted Muhammadanism. [The history of Mirza Haidar, called the Turikh-i-Rashidi, in describing the great plain of Eastern Turkistan, says, "Formerly there were several large cities in this plain; the names of two have survived, Lob and Kank, but of the rest there is no trace or tradition, all is buried under the sand. —Yule's 'Marco Polo,' 2nd ed., vol. i. p. 201.—M.]

† Keria or Kiria was, according to Mr. Johnson's information, nine marches, estimated by him at 154 miles, from Charchan, and 69 miles, which he actually traversed, from Ilchi or Khotan.—'R. G. S. Journal,' xxxvii. pp. 14, 41.—M.

from the colder parts of the high Gobi, and invariably brought with them thick clouds of dust which filled the atmosphere. Even after the violence of the tempest had abated, this dust remained suspended in the air, obscuring from view the whole horizon. A dust-charged atmosphere is indeed a characteristic of the basin of the Tarim, while a clear blue sky occurs but very rarely. This dust, peculiar to, though not so abundant in other parts of Inner Asia, as it sinks down upon the ground, forms that remarkable and highly fertile deposit which is known as "loess," and occurs sporadically over an enormous extent of country between the Caspian Sea and Pacific Ocean.

On the 20th March we left Lob-nor and took the direction of the oasis of Cherchen (Charchan), viâ the village of Chargalyk, a distance of 373 versts (249 miles).^{*} The last third part of this way lies up the Cherchen-daria, which flows from the borders of the Tibetan mountains. These mountains rise as an unbroken, gigantic wall, margining the whole plateau of Tibet from the head-waters of the Hoang-ho to the Karakorum. In their eastern part they are known under the name of Nan-shan, in their centre, Altyn-tagh. Beyond, towards the south-west from the sources of the Cherchen-daria, this range has no general name among natives, and I christened it "Russian" in the region between the Cherchen and Keria rivers.

The soil of the desert near the borders of the Tibetan mountains is composed of bare pebbles and shingle; beyond lie shifting sands which cover the enormous enclosed area of the Tarim basin. These sands present a confused medley of heaps, hillocks, and banks, interspersed with hollows and ravines. There is neither water, vegetation, nor animal life here. There may be, however, in the midst of the sandy wastes an occasional spring to form small oases, but such spots are absolutely inaccessible to human beings.

The eastern limit of the sand-dunes is the course of the Cherchen-daria, along which, as already stated, our route lay. Unlike other rivers of the Tarim basin, which form for themselves deep, trough-shaped channels, the Cherchen has not enough strength to furrow a deep bed, but flows in wide and ever-changing reaches along a soft sandy bottom. The current is very rapid, but the depth, except in the pools, is small; the water is exceedingly dirty. Notwithstanding this, fish of five different kinds are abundant; one of these attains a length of 4 feet, and a weight of 33 lbs.

The banks of the Cherchen are margined with a broad belt thinly covered with vegetation. Here the only tree growing is the variegated poplar, or, as the natives call it, "tugrok," reaching a height of 30 to 40 feet, with a thickness of stem of 2 to 3 feet in diameter. This tree has a crooked deformed growth, its bark is often cracked and hangs down, always covered with loess. When fractured, instead of sap exuding, there is a white saline crust. Among the bushes on the Cherchen, the most common are the tamarisk, myricaria, and a kind of kali; in smaller numbers were bushy growths of five other species. Reeds are everywhere abundant along the bank, and among herbaceous plants we occasionally saw *Compositæ*, *astragalus*, and wild asparagus. All these bushes and herbs were thickly covered with loess dust, so that one could not touch them without making one's self in a mess. Moreover the soil, both among the bushes as well as in the poplar woods, is bare loess and clay mixed with sand, now covered with a tolerably hard saline crust, now as loose as ashes. Everywhere under the trees were scattered boughs broken off by the storm, and heaps of dry leaves, which gave out a ringing metallic noise when driven before a strong wind. In a word, the landscape was desolate in the extreme, even in spring—in the first half of April. Notwithstanding the great heat, there was hardly any verdure visible except

^{*} Only 115 miles in Mr. Johnson's route vii. already referred to.—M.
No. XII.—Dec. 1885.]

in places where the shoots of reeds were forcing their way to the surface, and the poplar and elæagnus were opening their buds. Instead of flowers and butterflies, scorpions were crawling over the ground, and in calm weather clouds of gnats and mosquitoes disported themselves. Neither was the atmosphere any better. Here a thick dust brought by frequent gales constantly filled the air, shrouding the distant horizon and imparting a yellowish grey tint to surrounding objects. The sky too was almost always cloudy, and the sun, if it did come out, looked like a red disc, though its rays scorched us as mercilessly as ever.

Animal life on the Cherchen-daria was also poor. Among the larger beasts we met here with the antelope (*kara sult*), and more rarely with large deer (*Cervus elaphus*) and wild boar. Besides these were wolves, foxes, hares, and small rodents. Among birds, those most frequently seen were the saksaul jay, the saksaul sparrow, woodpeckers, shrikes, sand-swallows, and hoopoes, with an occasional pheasant. Water-fowl and waders were scarce along the river, for here there are no reedy lakes and other places where they like to rest, feed, and build their nests. Even in the full warmth of spring it was but rarely that we heard the note of a bird. And a death-like silence reigned over the river bank as well as in the neighbouring desert.

On the 14th April we arrived at the oasis of Cherchen, which lies at an elevation of 3800 feet on the same Cherchen-daria, 60 versts (40 miles) from its exit from the mountains, and like other oases of Central Asia, appears like a little green island in the wild desert. The whole oasis contains about 600 houses, in which there are about 3000 souls of both sexes. This settlement was founded only ninety years ago by emigrants from Khotan, Kiria, Aksu, and Kashgar. The first mentioned belong to the tribe of Machin, the last to that of Ardbiul. They are distinct in external type one from the other. The Machin is the ancient rootstock of East Turkistan, and now inhabits its south-eastern part, between Cherchen, Keria, and Khotan, and the neighbouring mountains. This tribe is also met with, though in small numbers, at Yarkand. The Ardbiul, according to the natives, live between Aksu and Kashgar inclusive. To the east of Aksu, in the towns of Boi, Kucha, and partly in Kuria, according to the same information, live the Khurasan, a tribe which, according to tradition, came here from Afghanistan even before the time of Alexander the Great. With these nationalities of Eastern Turkistan other tribes became mixed, for the most part as conquerors, more rarely as traders and colonists. Such were, in ancient times, the Uighurs, Chinese, Arabs,—the latter introducing Mahomedanism,—the Mongols, and, in modern times—the Chinese again, Andijanians (Kokandians) Hindus, Afghans, and others. We had only the opportunity of studying the Machinians, and will speak in detail of them hereafter. I will now say that this tribe, judging from its characteristic traits, shows an infusion of Mongol blood, while the Ardbiul, especially middle-aged and old men, have a strong resemblance to the Jews, or, more correctly, show a mixture of the Turkish and Semitic races.

There are no towns, i.e. walled habitations, in the Cherchen oasis, but only detached homesteads with fields and gardens adjoining. In the gardens there are apple trees, peach, apricot, white mulberry, plums, pears, and vines. The fields are sown with wheat, barley, rice, maize, beans, tobacco, melons, water-melons, carrots, and a small quantity of cotton. The extent of land under cultivation is small. I estimate it at not more than 1000 to 1500 deasiatines (2700 to 4050 acres). Here, as everywhere in Central Asia as well as throughout China, the fields may rather be called gardens, so diminutive are they and so carefully cultivated, doubtless owing to the abundance of manual labour. But with so dense a population and so small a supply of running water, indispensable for the fertilisation of this soil, every family only produces enough to satisfy its wants. At the best the surplus is small, and more often there is not enough.

Close to the oasis of Cherchen are the traces of two ancient cities, the oldest of which was destroyed, as we learned from the natives, about 3000 years back by the bogatyr [fabulous warrior] Rustem of Daghestan; the other city of a later date was annihilated by the Mongols at the end of the tenth century of our era. The sites of both cities are now buried under a barren desert partly covered with loess and sand hillocks. Here and there the remains of huts and walls stand forth, while cups made of clay, and occasionally, men's bones, litter the ground.* The natives find copper and gold coins, ingots of silver, gold ornaments for apparel, precious stones (diamonds and turquoises), beads, foundry slag, and copper utensils, and what is remarkable, glass in the older city, besides which, in the newer, burnt bricks. After excavating they have come upon single wooden coffins. In these the corpses (never embalmed) are sometimes well preserved, owing to the excessive dryness of the climate and air. The men are of great size and with long hair, the women with one or two tresses. Once they discovered a vault with the bodies of twelve men in a sitting posture. Another time the body of a girl was found. Her eyes were closed with gold cups, and her head bound round chin and crown of the head with a thin sheet of gold; she was dressed in a long but narrow woollen robe (in perfect preservation), ornamented on the chest with several gold stars; the feet were bare. Not only were the corpses well preserved, but even the wood of which the coffins were made, so much so that the people of Cherchen, as they told us, use it in various ways. With the human remains there occur in the graves bones of horses and sheep.

The people of Cherchen assured us that traces of ancient cities and settlements are found along the whole central course of the Cherchen-daria, 5 to 15 versts to the west of the present course of this river. Lastly, at the same Cherchen, at Lob-nor as well as in the oasis of Kiria, we heard more than once of a tradition that between Khotan, Ak-su, and Lob-nor, there were once twenty-three flourishing cities now buried beneath the sand of the desert.

At Cherchen, Lob-nor, and farther along our route, the inhabitants received us in a very friendly way. The Chinese, on the other hand, tried by every artifice to hinder us. They forbade the natives from selling us provisions and supplying guides; declaring that we would seize their property, that we were travelling with the worst intentions, &c.; in a word, they tried by every manœuvre to take our character away. But in spite of all this, the natives showed that they were well disposed towards us, and always were ready to serve us. At the same time they bitterly complained of their hard lot, assuring us that they were all ready to rise against their oppressors, the Chinese. And more than this, the elders, both of the oases and mountain tribes, asked us to give them the order to destroy the Chinese at once.

"We wish for nothing better than to become the subjects of Russia," they all said to us. "We know that justice reigns in Russian Turkistan. But with us every Chinese official, nay every soldier, may with impunity beat us, take away our property, our wife, children. They tax us in a most exorbitant way. . . . We cannot long endure such outrages. . . . We can rise at any minute; we have guns ready and concealed. All that we want is a head, a leader. Give us only one of your Cossacks; let him be our commander." Such tales we often listened to.

* This does not corroborate the passage from the *Tarikh-i-Rashidi* given above and quoted by Sir H. Rawlinson, Colonel Yule, M. Quatremère, and others. It is, however, not impossible, with the well-known shifting character of the sands of the Tarim basin, that traces of cities which have lain buried for centuries may have come to light.—Cf. 'R. G. S. Journal,' xxxvii. p. 7, and 'Proceedings,' xvi. p. 244.—M.

From Cherchen to Kiria lead two roads; the one through heavy sands, the other along the borders of the Tibetan plateau. We chose the latter though more difficult route; for by this way we could explore completely unknown mountains, and moreover save our camels from the heat and unbearable mosquitoes. Specially difficult were the first two days' travel, when for 87 versts (58 miles) from Cherchen to the foot of the Tibetan mountains we had no water.

In this part, the margining range, as already mentioned, has no general name, and I called it "Russian," as I once christened with a similar name on the opposite side of Tibet, the lake out of which flows the Yellow river.

The newly discovered Russian range forms the immediate continuation of the Tokus-daban,* which in its turn joins the Moscow range, forming together with the Columbus, Marco Polo, Burkhan-Buddha and others a second inner bulwark of the Tibetan plateau on the side of the Tsaidam (Chaidam) basin.

The Russian range extends from north-east to south-west between the rivers of Cherchen and Kiria for a distance of 400 versts (267 miles). Everywhere on the side of the Tarim lowlands, it stands as a lofty precipitous wall, occasionally rising above the snow-line. Particularly lofty is its south-western part. Here snowy peaks and ice-fields extend in an unbroken ridge, over which, near the Kiria river towers a colossal, cone-shaped peak, apparently from 22,000 to 23,000 feet above sea-level. It is called "The Tsar Liberator."

From the snowy summits of these hills rivulets course down, eroding for themselves in the alluvial soil of the plain, deep trench-shaped ravines, and then losing themselves in the shifting sands of the desert. The mountains themselves for a belt of 10,000 to 12,000 feet above the sea are covered with tolerable pasturage, affording grazing grounds for the herds of the local Machinians. The Russian range is rich, too, in gold and jade-stone—*yu-shi*, highly prized in China. Of this stone various articles are manufactured, such as tobacco-boxes, saucers, little boxes, mouth-pieces, &c.† Moreover, according to the belief of the Turkistanians, a bracelet of this stone placed on the arm of a dead person preserves the body from decay. Rich people make themselves pillows of jade to put inside their graves, under the belief that the marvellous power attributed to this stone will be proportionately greater.

There are no easy passes across the Russian range into Tibet,‡ though formerly there are said to have been roads along the defile of the Tolan-hadji, near the mazar (tomb) of Unchelik-pashim. This is the shrine of a sister of the Imam Djafar-Sadyk, one of the most esteemed saints of Eastern Turkistan; it lies about midway in the extent of the Russian range, and is visited by many pilgrims. Tradition says that Unchelik-pashim, pursued by Machinians who were trying to kill her, escaped to the mountains, and on reaching the spot where a mosque now stands, waved her handkerchief. Then one of the mountains opened and received the holy damsel. When she had entered the mountain again closed, but, unfortunately, so as to catch the rescued saint by her tress, the end of which is to this day shown to the faithful in a rock near the temple. Here, too, there is a spring which brings out of the rock pebbles of red, white, and yellow limestone. True believers prize these pebbles very

* I. e. the nine mountain-passes, a district mentioned by Mr. Shaw's native informant. Cf. 'Proceedings R. G. S.,' xvi. p. 244.—M.

† Articles in jade are sold in the Kulja bazaars, but the stone is so skilfully imitated that a novice may easily be taken in.—M.

‡ (Cf. 'Proceedings R. G. S.,' N.S., ii. p. 312, and the Parfüt A—k's route in vol. vii. of the same series (pp. 68 *seq.*); but the Pandit crossed Northern Tibet in a more easterly meridian than Lob-nor, nearly identical with Prejevalsky's first attempt to penetrate into that country.—M.

highly, and say they are the petrified tears of Unchelik-pashim who still weeps in the mountain for the sins of mankind.

After marching 397 versts from Cherchen we reached the oasis of Nia,* on a rivulet of the same name, 50 versts from its exit from the Russian range. The absolute elevation here is 4200 feet. The number of inhabited hovels is 1000 to 1200; they are grouped round separate farms. Once in ten days there is a bazaar, which is visited by merchants from Kiria. The Machinian inhabitants are much spoilt by their proximity to the gold-mine of Sorchak, situate on the Nia-daria where it leaves the Russian range.

We found a more cheerful site for our encampment at the little village of Yasulgun, where we passed several days in expectation of the arrival of our interpreter, who had fallen sick at Cherchen. There is a capital pond at Yasulgun, in which we bathed several times a day, a most opportune relief from the great heats which then (towards the end of May) were as much as + 37° Cels. (98° Fabr.) in the shade. The inhabitants of Yasulgun were very good-natured and hospitable. Their village life appeared full of simplicity: the little children ran about naked; bathed and rolled in the sand, playing, fighting with one another, and climbing the mulberry-trees like monkeys, for the fruit, which was then ripe. In the village itself swallows flitted to and fro, crows cawed, pigeons cooed, cocks crowed, and the hen chucked to her chicks . . . In fact village life here is just what it is with us; and the rural are much better than the townspeople.

Two marches from Yasulgun we reached the oasis of Kiria, larger than any we had hitherto seen. Its absolute elevation is 300 feet higher than the two oases of Nia, and its distance from Lob-nor, 870 versts (580 miles).† The river Kiria-daria, on which the oasis is situate, flows from the Tibetan plateau, and passing this place during flood time, continues for 200 versts further in a northerly direction before losing itself in the sands.

Kiria itself is said to contain 3000 habitations; but it is no town in the Asiatic sense, for it is not enclosed with a mud-wall, neither does it possess shops, except a few small ones, though a bazaar (or market) meets here twice a week. Besides native produce, there is an abundance of Russian goods, especially dyed fabrics—such as cotton prints, red fustian, plush, handkerchiefs, &c.; also Russian sugar (56 copecks per lb.), candles, &c. Russian money, both silver and notes, passes currency here. The local coin, as throughout Eastern Turkistan, is the silver *tengheh*, a little larger than our *grivennik*, containing thirty copper coins, *puls*.

Chinese silver ingots about 4½ lb. each are exchanged here for 1200 *tengheh* or thereabouts. The inhabitants of Kiria are as spoilt as those of Nia. They mostly engage in the gold industry. Agriculture only supplies local wants; there are comparatively few gardens; silk production and cotton growing are on an insignificant scale. There are no manufactures in Kiria, and nothing but gold is exported.

Formerly Kiria had no independent political existence, and was under the immediate subjection of Khotan. But now the Chinese have made of Kiria a separate

* Nia is the second stage (33 miles) from Kiria. Colonel Yule says that it is probably the ancient city of Ni-jang of the ancient Chinese itineraries ('Marco Polo,' i. p. 202).—M.

† This distance is much greater than that calculated by Mr. Johnson (269 miles), and by Mr. Shaw (304 miles, exclusive of windings), and must have some weight in fixing the position of Lob-nor, which it was proposed to shift three degrees to the westward of that assigned to it on Kiepert's map of Asia. Cf. Yule's 'Marco Polo,' 2nd ed., i. p. 204.—M.

‡ About the size of a sixpence.—M.

district, subject to the authorities at Kashgar. This district extends eastward to the village of Chargalyk near Lob-nor, besides taking in some of the hill tribes of the Machinians. There are altogether, as we heard, 11,000 to 12,000 families in the Kiria district.

The oases of Nia and Kiria begin the long row of such oases extending with greater or less intervals through Khotan and Yarkand to Kashgar, and then along the southern foot of the Tian-Shan. Their general appearance and character have much in common. The chief occupations of the inhabitants are agriculture and horticulture. Husbandry favoured by an abundant supply of labour, a warm climate, and an unusually prolific loess soil, well supplied with irrigation, has attained a high degree of perfection, even from very remote times. Inexorable necessity has obliged the native to employ all his energies in irrigation works, which ramify like the veins and arteries in the animal organism, and fertilise every plot of arable land. To the unaccustomed eye it is wonderful to see how these water channels cross and recross one another in the oasis, now flowing side by side, only at different levels, now coursing through wooden troughs placed one over the other, and again pouring over the flat roofs of the hovels in the same troughs. Water brings life wherever it comes—it not only moistens the soil but fertilises it with loess mud. The larger dykes, from which smaller channels are led, start at great distances of many versts from the oasis, and if the river reach the oasis it flows at a much lower level than the fields and gardens supplied with its water.

The mode of cultivation, not only of the gardens and orchards but of the fields, is admirable. The soil is so thoroughly tilled that not a clod is left; the whole field is divided into small rows, and these are sown with the grain, whilst every furrow is filled with water. The agriculturist knows exactly when to turn the water in and when to shut it off. The fields are usually not large, and are arranged in terraces one above the other for convenience in irrigating. Strict order is observed in regulating the supply for each owner, and special overseers superintend this part of the work. The rice-fields are on the lowest ground and almost continually flooded. Every hovel, every garden and enclosure, nay, every big tree if it stand alone, has its separate water supply turned on or off as occasion requires. The banks of the dykes are usually planted with poplar, willow, *elæagnus*, and mulberry, serving both to give shade and firing. They are treated in the most tender way, if we may use such an expression. Hence these trees grow rapidly and freely. In seven or eight years a poplar is of sufficient size to supply a log fit for building purposes, and in thirty to thirty-five years measures two spans in circumference, with a height of 100 feet. For firing, the tree (willow or poplar) is cut 14 feet from the ground and the stump stopped with clay so as to prevent its drying. Such a stump will send out fresh growth, which soon forms a thick handsome head of branches, especially in the case of the willow. Only those trees which have dried up are felled at the root.

All the oases are sown with wheat, barley, maize, rice, peas, millet, clover, melons, water-melons, tobacco, and cotton; the kitchen gardens—with onion, radish, turnip, carrot, cucumber, gourds, and cooking herbs; the fruit-gardens—with apricot, peach, grapes, apples, pears, plums, pomegranates, nuts, and mulberry; here, too, there are often small ponds (*bostang*), and flower-gardens, in which grow roses, asters, pinks, balsams, and other flowers. The fields are generally small in comparison with the number of inhabitants. I estimate the average quantity of land for a family of five persons at hardly as much as two dessiatines (5·4 acres). This insufficiency of land is counterbalanced by the excellence of the crops of grain as well as by the moderate wants of the native, who grows only enough for his own use and has hardly anything over to sell; many natives having several families to support.

The enclosures round the hovels are generally on a miniature scale, and the vegetables are poor. But the fruit-gardens are much better and larger. The most careful attention is bestowed on the trees, which grow admirably and yield excellent fruit. It is only to be regretted that the natives gather the fruit before it is ripe, and are careless in their treatment of it. Apricots, peaches, and grapes are dried, and in this form are the invariable accompaniments of the *dosterkhana* (entertainment). Apples, melons, and grapes keep fresh all the winter. Fresh fruit in summer and dried fruit in winter are a great addition to the *régime* of the native.

I will now continue the description of our journey. The Chinese authorities, whom we first met at Kiria, received us with every outward mark of respect, but continued to maintain their previous system—flattering us before our faces and insidiously doing us harm behind our backs. Thus, on learning that we had the intention of proceeding to Tibet, the amban of Kiria secretly ordered the destruction of two bridges in the mountains, and the obstruction of the pathways with stones. At the same time this very amban was so afraid lest our arrival should cause an insurrection among the inhabitants that he gave orders to collect by force from the latter all their supplies of grain, which he stored in eight hovels, and these, we were told by the people, he mined, so that in case of a rising he could spring the mines and deprive the insurgents of food. The amban also rode out several nights in succession with an escort, and encamped outside the oasis fearful again of a surprise.

GEOGRAPHICAL NOTES.

The Exhibition of Geographical Appliances.—This Exhibition will be formally opened on December 8th, at 2.30 P.M., by the President of the Society, the Marquis of Lorne. The object and nature of the collection will be then explained. In connection with the Exhibition there will be a short series of lectures and discussions, at which it is hoped those specially interested in geographical education will be present. There will be two short lectures, followed by discussions, before Christmas, one by Mr. Ravenstein, on the aims and methods of geographical education, and another, by Mr. Keltie, on apparatus; and in January, it is hoped, two or three other lectures will be delivered, on the scientific, technical, and industrial aspects of geographical education, by men recognised as authorities in their special departments. The Exhibition, we may remind Fellows, is at 53, Great Marlborough Street.

Mr. H. O. Forbes's Expedition.—Mr. Forbes arrived safely at Port Moresby in company with Sir Peter Scratchley, early in September, and made immediate arrangements to start for the interior in company with the experienced traveller the Rev. Mr. Chalmers.—We have to acknowledge the receipt of the following sums subscribed in response to Mr. H. H. Johnston's appeal, on the occasion of news arriving of the shipwreck of Mr. Forbes' stores, in the *Times* of October 1st:—J. S. Budgett, 25*l.*; Miss North, 5*l.*; H. H. Johnston, 3*l.* 3*s.*; Mrs. Forster, 1*l.*; W. W.

Chandless, 10*l.* 10*s.*; Mrs. A. Hodgson, 1*l.* 1*s.*; Mrs. Wark, 20*l.*; J. M. Cook, 5*l.* 5*s.*; Jos. Tarratt, 5*l.*; J. R. Capron, 2*l.*; and E. A. Floyer, 5*l.* Total, 82*l.* 19*s.* The amount has been paid to Mr. Forbes's account at the Chartered Bank of India, Australia, and China.

The Assassination of M. Charles Huber in Arabia.—At the meeting of the Geographical Society of Paris, held on the 3rd of July last, M. de Lostalot, Vice-Consul of France at Jeddah, gave some details with regard to the assassination of M. Ch. Huber, during his journey into the interior of Arabia. The unfortunate traveller, contrary to the advice of M. de Lostalot, was attempting to reach Medina, the entrance to the sacred city being forbidden to all Christians. Accompanied by two guides and his servant Mahmoud, he left Jeddah; and on the third day he, with the guides, diverged a little from the route, instructing Mahmoud to meet him at noon at a particular spot. The servant, on arrival, found his master lying dead, and states that the guides threatened to take his life also. Accounts differ as to which of the guides actually killed M. Huber, but it seems probable that the guide named Hussein Ben-Adi shot the unfortunate traveller in the breast while he was smoking and reclining on the ground. M. Huber thereupon sprang up, and seized the ruffian by the throat, when the other guide interfered and the traveller was thrown to the ground, where he received a second pistol shot in the head. Hussein decamped with the traveller's baggage while the other guide deprived Mahmoud of his belongings. These particulars were obtained by the Vice-Consul, partly from the statements of Mahmoud, and partly from the confessions of the guides. A trusted agent, sent by M. de Lostalot, had after many adventures recovered at Hail part of M. Huber's baggage, including the famous stela of Teima, and other stones covered with interesting inscriptions. The whereabouts of the two assassins is known to the Vice-Consul, who hoped to be able to bring them to justice, in spite of the want of co-operation on the part of the local authorities.

Alleged Discovery of a Salt Lake near Ispahan.—In the *Times* of 19th ult. is a telegram of the previous day from Vienna, stating that Dr. Stapf of that city had "found at the mouth of the Sayendarood river, in the steppe near Ispahan, a salt lake of about 26 square miles in extent." To this statement is added the suggestion of the distinguished orientalist, Dr. J. E. Pollak, that "this lake is a periodical one, as it is not marked in maps, and has never been mentioned before." Now, not only is a marsh or lake into which the Zainda-rud (rather, perhaps, Zinda-rúd, "living river") empties itself, indicated in Major St. John's map under the name of "Gavkhánah," but reference is twice made to it in the first volume of 'Eastern Persia' (Macmillan, 1876), at pages 10 and 106.

M. de Brazza.—This eminent African explorer arrived at Lisbon on November 12th, and reached Paris on the 18th. He received a very warm

reception at the railway-station. M. de Brazza speaks with satisfaction of the French possessions on the Congo. Before embarking at Banana on October 13th he had visited all the territories belonging to France. The whites and natives, he states, are on the best of terms; the germs of a definite organisation had been formed, while natives were being recruited to form an army. In the course of the past summer, it is stated, M. de Brazza had organised two expeditions for the purpose of surveying the region towards the Cameroons river.

A Swedish Mission to the Congo.—The Royal Swedish Society for Anthropology and Geography has commissioned one of its members, Baron H. von Schwerin, professor of geography at the University of Lund, to proceed on a scientific journey to the Congo. The object of the journey is to study and report on the hydrographical conditions of the Congo valley, its geographical features, and to collect geological, botanical, and mineralogical objects. The professor will collect also ethnographical objects, and report on the anthropological differences of the races. The Swedish Government have taken advantage of Baron Schwerin's mission to request him also to inquire into the position of the Swedish and Norwegian settlers in the Congo Free State, ascertain what advantages the country offers for the sale of Scandinavian products, and whether the circumstances require the establishment of a consulate there. The Barons Dickson and Nordenskiöld have supplied to the expedition a variety of scientific instruments.

San-Benito River, West Africa.—A French traveller, M. Leon Guiral, now engaged in exploring this river, which enters the Atlantic, about 70 miles north of the Gabon, has recently given an interesting account of this little-known part of Western Equatorial Africa, the home of the cannibal Fans and the gorilla. The river is navigable only up to its first falls (Yobé), about 22 miles from its mouth; from that point, M. Guiral was compelled to take the land route. Between the village Makike to Maliko the river receives three tributaries, the Pardiebe, the Longüe, and the Mandjakue, which flow through a well-wooded, hilly district, over very rocky beds. The region abounds in elephants and gorillas; the latter remain in the forests during the fruit season, and afterwards ravage the plantations near the villages. Passing by Maliko and the falls there, the traveller reaches Sungüe, which is situated among the mountains bordering on the river. Beyond the village of Moroko the route becomes difficult, and in many places the guides had to first force a passage through the dense creepers and branches. The river receives on its left bank the Lange, which is its most important tributary. The latter, which possesses a mean breadth of about 36 yards, and a depth of two feet, has, like the San Benito, a very rocky bed. The traveller arrived at last at Lake Ediba, which is situated in the middle of a large valley surrounded by high mountains. The lake is about 550 yards long, and

220 broad, and is fed by a small stream. The distance from the coast to the lake is 87 miles. M. Guiral stopped at the village of Njela, as war had broken out between the Pahuins (Fans) and the Balanigny. On returning to the coast he had entrusted his baggage and stores to the care of the chief of Njela, as he contemplated making a fresh journey among the lofty mountains surrounding Lake Ediba. M. Guiral is probably the first white man who has penetrated so far up the river, as the aged chief Ngombe had never seen a white man before, and was quite alarmed at the traveller's appearance.

MM. Capello and Ivens's African Discoveries.—From an official circular issued by the Lisbon Geographical Society we take the following statement as to the work accomplished by MM. Capello and Ivens in their recent journey across Africa, from Mossamedes to the East Coast. Among the achievements of the two explorers, we are told, are "the rectification of the course of the Cunene (wrongly called 'Nourse river' on some English maps); determination of the Cuarraí and its connection with the Cubango, as also the interesting hydrography of Handa and of Upper Ovampoland; investigation of the Cubango from 15° to 17° S. lat., and of its eastern affluents; that of the basin of the Upper Zambesi at Libonta, and of the upper and middle course of the Cabampo tributary; the discovery of the Cambai, the eastern arm of the Upper Zambesi; the study of the sources of the Lualaba and the Luapula, as also that of the northern tributaries of the Zambesi, and the discovery that the Loangwa and the Cafuú are one and the same river. The work of the explorers determines, either directly or indirectly, the relation of the basins of the Congo and of the Zambesi. The information which they have obtained regarding the Bangweolo region modifies existing notions, and confirms certain former Portuguese indications. The great lake Bangweolo is proved to be only a marshy zone connecting two smaller lakes, the Bangweolo on the north and the Bemba on the south. No doubt Messrs. Capello and Ivens's own narrative will soon appear, and the details of the remarkable discoveries they are reported to have made will be looked for with very considerable interest.

Danish Expedition to East Greenland.—The expedition to the eastern side of Greenland under Lieutenant Holm, which left Denmark in the spring of 1883, returned to Copenhagen on the 3rd of October last. The party reached a latitude a little further north than that attained by Captain Graah, and passed the place touched at by Nordenskiöld in 1883. We gave an account of the proceedings of the expedition up to March 1884, in the 'Proceedings' for 1884, p. 538; and hope in our next to furnish some details of the whole work accomplished.*

* We take the opportunity of correcting an error in the name of the station, *Nannortalik*, occurring more than once in the note referred to. It should be *Nannortalik*.—[Ed.]

Alaska.—The U. S. revenue steamer *Corwin* arrived in San Francisco on October 12th, from Alaska. She brought with her the party sent out last year to explore between the Copper and Yukon rivers; they were Lieutenant H. F. Allen and Sergeants Robertson and Fickett, of the Army Signal Office. They had crossed from the head-waters of the Atnah river to those of the Sarranah, descended the latter to the Yukon, and the Yukon to the sea, thus accomplishing a most creditable journey, and one which a previous party had failed to carry out. A considerable part of it was over an unexplored region. Messrs. Garland and Beatty, two English travellers, who had crossed from the Mackenzie to the Yukon and descended the latter, were taken up with the American party, and brought to San Francisco. The *Corwin* party themselves did some good exploring work this season. Lieutenant Cantwell returned to his explorations of the Kowak river, while Assistant-engineer M'Lenegan undertook the exploration of the Nunatok or Ncatok, a stream falling into Hotham Inlet near and west of the Kowak. Another party is wintering near the head of Hotham Inlet.

Hudson's Bay.—The steamer *Alert* arrived at St. John's, Newfoundland, October 14th, from the second attempt to reach Hudson's Bay, having visited all the stations where observers had been placed in 1884, relieving the parties and supplying their places with fresh observers. The results of work at the stations had been favourable, though exact details have not yet been received.

Arctic Exploration.—An interesting discussion, according to 'Science,' took place at the meeting, October 9th, of the U.S. Naval Institute at Annapolis, on the subject of Arctic Exploration. Mr. Clements R. Markham, who has been visiting the United States, presided, and the paper of the evening was read by Lieutenant J. W. Danenhower, of the unfortunate *Jeannette* expedition. The point of the paper was the inadvisability of further Arctic exploration, and Lieutenant Danenhower declared himself as definitely opposed to further exploration of the Polar region bounded by the 85th parallel, mainly on account of the risks incurred and the little gain to science to be expected. The paper was supplemented by others received from Chief-Engineer Melville, Sir George Nares, and Lieutenant Greely, and discussed by Dr. E. Bessels and Mr. Markham. Letters in favour of further Arctic exploration were read from Prof. J. E. Nourse, U.S.N., and Dr. Rink, formerly Governor of Danish Greenland. The tenor of the discussion, generally, according to 'Science,' was to the effect that, while it might be admitted that further exploration could not be justified on utilitarian and commercial grounds, nevertheless, without reference to scientific results, the world could not but gain by the examples of determination and heroism which Arctic exploration may be counted on to develop in the future, as it has done in the past; that individuals and nations cannot afford to gauge their

endeavours by a merely commercial standard; and, last, that in regard to the facts of terrestrial physics to be determined by Arctic exploration, Mr. Danenhower had come to an unwarrantable conclusion. The latter view, 'Science' states, was especially insisted on in a vigorous and comprehensive statement by Mr. Markham. While 'Science' itself strongly opposes expeditions for mere glory, officered by men whose courage, enthusiasm, and inexperience are their only qualifications, scientific exploration of the Arctic regions, it believes, will go on. "That the crown of the sphere shall be left to solitude and the auroras, while science with her questions and man with his ambitions coexist upon this planet, is a proposition requiring no refutation."

Geography in Japan.—We have received the sixth volume of the 'Journal' of the Tokio Geographical Society. We note the following:—The five races of the Chinese Empire, and their ancient progress, by Mr. Otori; the interior of Northern Corea, by Mr. Kaizu; travels in Siam; notes on Tibet (compiled from European sources); Formosa under the Chinese; Manchuria; recent events in Annam; travels in South-eastern Russia; the salt-tax in China; colonisation in Saghalien (a review); Formosa during the Dutch occupation; historical notes on the relations between Russia and China; notes on the aboriginal language of Formosa, with a considerable vocabulary; Candahar and the Lower Cabul Valley, with a sketch map; the mines of Central Japan, with a map; and various other minor communications. The first number of the tenth volume contains a paper by Mr. Akamatsu on the origin and condition of the Chinese emigrants to the Philippines, based apparently on the writings of Prof. Blumentaitt on the subject; and one on the longitude of Japan, by Mr. Arai, the head of the meteorological bureau. The 'Journal' is printed in Japanese, but a short table of contents is appended in English.

M. Chaffanjon's Travels on the Orinoco.—M. Chaffanjon, the French traveller who has been exploring the upper parts of this river, returned to France in July last. With the view of preparing a complete hydrographical map of the basin of the Orinoco, he made numerous excursions along both the right and left banks of the river, and into the interior. In the course of his explorations, he has discovered a large number of inscriptions, which will throw fresh light upon the history and character of the native races of the country. He has collected numerous ethnographical objects, through intercourse with the Caribes, Panaies, and Mapoyes. He reports travelling to be very costly in these districts and provisions dear. During one of his journeys into the interior of Caura, the traveller narrowly escaped with his life, in consequence of the treachery of one of his guides. He had arrived at the village of Caraucura, near the Brazilian frontier, and, acting on the information of his guides, had proceeded, in company with two of them, to a retired

spot near the village to inspect some skeletons of the Guagnungomas. While preparing to take some of them away as anthropological specimens, he was surprised by a party of twelve Guagnungomas, led by his late guide. M. Chaffanjon managed to kill the leader, whereupon the rest fled. One of his faithful guides was killed, while the other aided the traveller to escape from the natives, who returned to pursue him. After spending some hours up to his waist in a marsh, the traveller reached Caura, thence he journeyed down the river to Temblador, arriving there on the 7th of April. He subsequently returned to Ciudad Bolivar via Canara and the river Meta. He has prepared a map of the course of the Orinoco between Caicara and Ciudad Bolivar, on the scale of 1 : 660,000, which contains a quantity of new information.

Population of Brazil.—According to the *Anuario* of Dr. Graciano, the estimated population of the provinces of Brazil is as follows in 1885 :—

Minas Gernes	2,449,010	Brought forward ..	10,610,811
Bahia	1,655,403	Piauhv	239,691
São Paulo	1,058,950	Santa Catharina	211,173
Pernambuco	1,014,700	Sergipe	201,043
Rio de Janeiro	938,831	Goyaz	191,711
Rio Grande do Sul	899,100	Paraná	189,668
Ceará	722,000	Espirito Santo	100,717
Parahyba	432,817	Amazonas	80,942
Maranhão	430,059	Matto Grosso	72,051
Alagoas	397,379	Municipio Neutro (City of	
Pará	343,511	Rio)	435,568
Rio Grande do Norte ..	269,051	Wild Indians	600,000
Carried forward ..	10,610,811	Total ..	12,933,375

Uruguay.—Mr. Gifford Palgrave, H.B.M. Minister at Monte Video, has sent to the Foreign Office a very full account of Uruguay, which is published in a recent Commercial Report (No. 25, 1885). Mr. Palgrave has made a very complete study of the republic in its various aspects, and under the following heads conveys information that will be of service:—Geography and geology, climate, vegetable and mineral products, population (which he estimates at about 700,000), territorial divisions, annual produce, law, property, government, education, and commercial statistics.

The Argentine and Brazilian Boundary.—The boundary between the territory of the Argentine Republic and Brazil, forming the western limit of the province of Santa Catharina, has been for some time in doubt. Up to the present the disputed area between the Uruguay and Iguassu rivers, a strip some 75 miles wide, has been regarded as neutral ground. An old treaty between Spain and Portugal fixed upon two rivers, the Peperi and San Antonio, flowing respectively north to the

Iguassu, and south to the Uruguay, as the boundary in question. The determination in modern times of the particular rivers, out of many existing, which were entitled to bear the above name, has been fraught with difficulty. The two Governments have now agreed to a joint exploration of the neutral ground, in order that the matter may be permanently settled.

The State of Geographical Education in Denmark.—In order to test the condition of education in Denmark, the Government decided at the beginning of this year to have a test examination among the recruits of the army and navy, on the Belgian principle. The result of this examination appears to have been very discreditable to education in Denmark, and particularly to that of geography. One of the examiners, the Rev. J. L. Bang, of Langaa, has given some particulars of the results, from which we quote. The regiment selected was the Life Guards, the crack regiment of the Danish army, the recruits, 282 in number, being drawn from every part of the country. Questions, such as how many ells (the Danish measure) go to a mile, and the size of an acre of land were answered by a very few only. But as regards geography the answers were far worse. In answer to the question, "Which is the capital of Sweden?" Paris, Trondhjem, St. Petersburg, Amsterdam, London, Madrid, Copenhagen, and even Constantinople were given; and to, What were the names of the four largest towns in Denmark? London, Paris, Berlin, Vienna, and every town between Copenhagen and the Scaw, including villages like Esbjerg (spelt Esbierre), Korsør, and Elsinore. Only a very limited number could tell in what country Paris is situated. The questions as to the names of the four cardinal points, and how they were found by the aid of the sun, puzzled most of them, the former being given as America, Africa, Australia, India, and Europe, as well as the north, south, east, and west poles; whilst to the latter question no answer was returned. The reverend gentleman states that questions in other departments of knowledge displayed equal ignorance. The result appears to have caused great indignation in Denmark, particularly as some of the most ignorant were actually rural school-board teachers. Herr Bang concludes by recommending the establishment of proper training colleges for teachers, with State subsidies.

CORRESPONDENCE.

The Geographical Nomenclature of places between Merv and Herat.

3, OBSERVATORY AVENUE, KENSINGTON, W.

IN the September number of the 'Proceedings of the Royal Geographical Society,' Professor Vambéry lays down the correct spelling of certain places in the disputed country between Merv and Herat. With every respect for the distinguished traveller's Oriental scholarship and literary powers, and admiring the intelligence he has displayed in generally compassing the mode of transcription which commends itself in these modern days to English Orientalists, I must enter a quasi protest against the wholesale adoption of his rules as defined in his examples. Let me, for instance, at once take exception to twelve of the twenty-eight words he has qualified as Persian by prefixing the letter P. They are:—

Chemeni-bid,	which I should write	Chaman-i-bid.
Chihar-bag	"	Chahárbágh.
Cheshme-i-Sebz	"	Chashmah-i-sabz.
Chihil Ghez	"	Chihlgaz.
Ghermab	"	Garmáb.
Keman-i bihisht	"	Kamán-i-bihisht.
Khurshid Kalesi	"	Khurshid Kal'ahsi.
Nemeksár	"	Namaksár.
Penjdeh	"	Panjdeh or Panjdih.
Ruzenek	"	Ruzanak.
Diban	"	Daban or Dahân.
Tanghî Darya	"	Tang-i-dariya.

I have respected the more familiar letter-combinations in "Merv" and "Herirúd," though both are strictly unwarranted. The former is shown by the Professor himself to be from "Mar"; and the latter finds authority for "Hari" in the "Hariva" of the inscriptions of Darius. But the *e* is seldom, if ever, required to supplement *a* or *i* according to the true Persian pronunciation. It belongs to the Persian of Turks on the west and Indians on the east, too frequently accepted as genuine by European students. The *h* which has been added to *chashma* and *kal'a* represents a *real* transcription, but may be omitted on the understanding that the final unaccented *a* is accepted as *ah*. Why the *gh* has been discarded for *g* in *bâg*, and, on the other hand, why *gh* has been used for *g* in *Garmâb*, cannot be intelligible to English apprehension, under any rules of transliteration.

The above I may call my own indeliberate remarks on a paper which had escaped notice until long after publication; but the following notes are mainly the outcome of attention to the views of others:—

1. May not the "Chihlgaz" translated as "forty yards," be held to mean forty tamarisk-trees—a rendering of the word "gaz" already suggested in "Darah-gaz"?

2. "Robat," an Arabic word interpreted as "a building," must be the *ribât* of Freytag and the *Āmûs*, explained in the former as "firma structura," in reality a "fortified caravansarai."

3. The two places named respectively "Kelle-Hauz" and "Kelle-burun"—interpreted as the "skull reservoir" and the "cape of the skulls"—may probably

be misreadings for *Kal'ah-i-Hauz* and *Kal'ah-i-búrún*, the "fort of the reservoir," and the "fort of the promontory—or bluff."

4. "Kom-bau," the name of a pass and rivulet, is possibly *خُمبِهْ*, *khumbah áo*, the "stream of the jar" (strictly *khumbahi-ab*, the "jar of water") according to an old Persian tradition that a jar was found in the neighbourhood. *Áo* is a well-known vulgarism for *áb*, "water."

5. "Mulla Khairan Tekke," translated "the Tekke Mulla Khairan," may rather be the "ṭak'īya," or "shrine" of Mulla Khairan.

6. "Nihál-shíni," translated the "sprout of joy," is not improbably a corruption of the common Persian compound "n'al-shikan," the "shoe-breaker."

7. The compound "Yeke-tut," said to be the "single mulberry-tree," is surely the "two mulberry-trees," if indeed Turkish, as stated. If Persian, "one tree" is intelligible.

8. May not the word "Kuyrukli," translated "having a tail," be "Kur-ugli," a well-known proper name?

FREDERIC J. GOLDSMID,
Major-General.

The Reported Subsidence of one of the Faroe Islands.

COPENHAGEN, HAVNEGADEN 35, K.
October 11th, 1885.

In the 'Proceedings' of the R.G.S. for September last, page 611, an account was given of the subsidence of the rocky islet Munken, one of the Faroe islands, translated from *Amtstidende for Færøerne*. When it was reported here that some part of the Munken had fallen in, an order from the Minister of our Navy, Mr. Ravn, was sent to my son, Captain Frederick Irminger, who this year commanded the station around Iceland and the Faroes, to examine the Munken, and herewith I take the liberty of sending you the result of the examination, which shows that the Faroe newspaper was not correct in its information. The examination of Munken gives the following:—This rock lies about 3½ nautical miles from the most southern point of Suderoe. A part of Munken is fallen down; but still this rock has a height of 30 feet above the level of the sea, and will, in clear weather, with the eye elevated 18 feet, be seen at a distance of 11 nautical miles. The three flat rocks lying close to the north-east of Munken, called "Fleserne," have a height of about 16 feet above the level of the sea. The situation of Munken is 61° 22'·5 N. lat., and 6° 45'·5 W. long. (Greenwich).

Clements R. Markham, Esq.

C. IRMINGER,
Admiral Danish Navy.

REPORT OF THE EVENING MEETINGS, SESSION 1885-6.

First Meeting, 16th November, 1885.—The Most Hon. the
Marquis of LORNE, K.T., President, in the Chair.

ELECTIONS.—*Ralph Adams Coker Beck, Esq.*; *John Samson, Esq., c.e.*; *Charles E. Taylor, Esq., m.d.*; *Frank C. Wilks, Esq.*

THE LATE LORD HOUGHTON.

The PRESIDENT said :—Before I read the few observations with which I have to open this Session, I am sure you will agree with me that a word or two should be said with reference to the loss the Society has sustained in the death of our Trustee and friend, Lord Houghton. Lord Houghton was, as you know, a Trustee of this Society; but of course, for us, it is not in any official capacity that we shall chiefly remember him, but as a genial friend and a constant attendant at our meetings. He is now gone to that bourn from which no traveller returns; but I am sure you will agree with me that it is very rarely we meet with such a man whose wide knowledge never made him in the least dogmatic, and whose geniality was as unaffected as his conversation was charming and instructive.

The PRESIDENT then read his opening address (*ante*, p. 777), after which the following paper was read :—

“ Exploration-Survey for a Railway Connection between India, Siam, and China.”
By Holt S. Hallett, Esq., c.e.

Will be published, with map and illustrations and the discussion which followed its reading, in the January number of the ‘Proceedings.’

PROCEEDINGS OF FOREIGN SOCIETIES.

Geographical Society of Paris.—June 5th, 1885: M. ALPH. MILNE-EDWARDS in the Chair.—M. Adrian Chaigneau, of Valparaiso, transmitted a small work upon the Chilian expedition which was undertaken with the object of discovering the position of Bariloche, the site of which had remained a mystery for the last 200 years.—A communication was read from Col. Venukoff, giving news of M. Prejevalsky's explorations in the Kuen-lun range; announcing also the publication by the Academy of Sciences of St. Petersburg, of an important work on terrestrial magnetism in Russia in Europe. M. Venukoff further informed the Society that Dr. Zélandt had just completed a large work on the Kirghiz steppe. His manuscript had been presented to the West Siberian section of the Geographical Society of Russia, and would shortly be published. The work was very extensive, being divided into seven parts. M. Venukoff presented to the Society two sheets of the large map of Russian Turkistan, published at Tashkend. This map is on a little larger scale than the excellent map of Algeria (being 1 : 42,000 against 1 : 50,000), published by the French Staff. The mode of reproduction is less complicated—the writing being engraved; while in the case of Colonel Perrier's map, movable type was used. The general appearance, however, of the two maps is much the same.—M. Haugsen-Blangsted made a communication with reference to the exact situation

and character of Port Hamilton.* The islands included under this designation are almost destitute of wood, but abound in good water. The tides and currents round the islands are very irregular.—M. René Allain again drew the attention of the Society to the importance of the Pescadores Islands, and urged the necessity of France retaining possession of them.—A communication was received from M. Alfred Bardey, dated 20th May, from Aden, stating that M. Henry, the French Consular Agent at Harar, was at Zeila, carrying on negotiations with the chiefs Gadi-Boursi and Ghibril-Abokor, with the view of opening up a route across their territories, and by this means bringing down to the coast the important trade of Harar and Ogadayn. M. Bardey, however, was of opinion that this route would be found impracticable for various reasons, and that the only way to accomplish the desired object was the one originally suggested by M. Henry, viz. through the country of the Issas, who were accustomed to the transport of goods belonging to Europeans, and along the Gulf of Tajura.—M. Charles Rabot presented a topographical sketch of the different Norwegian glaciers known under the general name of Svartisen, which had been prepared by M. Schrader from the extensive personal observations made by M. Rabot.—M. Bénéioù Méchin made an interesting communication on the Merv oasis and its inhabitants.—Papers also were read by M. Virlet [d'Aoust, on the different causes determining earthquakes; and by M. G. Angelvy, a French engineer in the service of the Sultan of Zanzibar, on his journey in the basin of the Rovuma River.†—In conclusion, M. Simonin read a paper on the pictorial writing of the North American Indians, which he said was in principle the same as the hieroglyphics of the Egyptians and the letters of the Chinese.

— June 19th, 1885: M. ALPH. MILNE-EDWARDS in the Chair.—Among the works presented to the Society were the following—a map of Albania and Epirus, by M. Bianconi, containing new geographical and ethnographical information; and Mr. H. M. Stanley's new work, entitled 'The Congo and the Founding of its Free State,' presented by the author.—M. Gabriel Marcel, of the National Library, sent a paper on the ancient description by Jean Oliva of the coasts and ports of the Mediterranean, which had recently been discovered by the Librarian among the papers of the Society. The document, which was executed about the end of the sixteenth century, and is therefore of comparatively recent date, does not possess, according to M. Marcel, any great historical interest.—A correspondent at Jeddah informed the Society that the baggage of the late M. Charles Huber, including the celebrated stela of Teima, had been found, and that it was in the possession of the French Vice-Consul at Jeddah, to whose energy and skill the recovery of this important epigraphical monument was due.—Dr. Gustave le Bon forwarded a *résumé* of the journey which he had just accomplished in India at the request of the Government. The special object of this journey was to survey, study, and describe the principal architectural monuments of India. In the course of his mission Dr. le Bon has travelled over a large part of India, including the district of Nepal, which is so difficult of access to Europeans, no Frenchman having previously visited the province. He has carefully examined altogether 173 monuments, and traversed 12,000 miles of country in the short space of six months.—A pamphlet entitled 'The Tongking Question before and after the Treaty with China,' written by M. J. Pène-Siefert, was presented by M. J. Dupuis, who remarked that the idea of the author was to send a mission of specialists to inquire into the geology, natural history, &c., of Anam, which would guide France in her future operations in that country. M. C. Laroche, General Secretary of the Naval and Colonial Institute of

* 'Proceedings R.G.S.,' May 1885, p. 340.

† Ibid., Nov. 1885, p. 743.

France, transmitted the sketch and first-corrected sheet of a map of Tongking, Anam, and the surrounding countries, on a scale of 1:400,000.—M. Dutreuil du Rhins presented, on behalf of M. Rueff, a map of Southern Indo-China, and made some remarks on the means of communication in the country. These were, he said, principally fluvial, and must be considered to be so in future, at any rate as far as commerce was concerned. The principal system was that of the Mekong and its branches forming the delta, and the branch uniting them to the large and small lake, which are navigable from July to January. The second system was composed of the Donnai, Saigon, and other smaller rivers, more or less navigable.—In conclusion, M. G. Depping made some comments on the coal resources of China, giving an analysis of the results of Baron F. de Richthofen's explorations in China on this subject (1868-72).

— July 3rd, 1885: M. ALPH. MILNE-EDWARDS in the Chair.—The Neu-châtel Geographical Society, which was started early in the present year, sent a copy of its rules, &c., and announced that its members numbered 150.—Among other presentations, was a copy of M. Viard's recently published work on the Lower Niger, and an ancient geographical map of the Jesuit Missions in South America, forwarded by Dr. L. C. Tibbon, French Consul in Bolivia.—A communication was made by M. G. Marcel of the National Library, on a new heliographical process for reproducing geographical maps and plans, of which M. J. Gaultier is the inventor. He said that the results hitherto obtained by photography were not satisfactory, it having been impossible to produce heliographical plates of large dimensions and sufficiently perfect not to require after-touches. Several successful experiments had been made on ancient maps. The new method, the cost of which was comparatively small, would prove of immense value in multiplying copies of ancient documents, now so carefully preserved in the libraries of Europe, for the purpose of study and comparison.—A paper was read by M. J. Giraud on the changes of level on the coasts of the Scandinavian peninsula.*—Lieutenant Gouin, French Resident at Nam-Dinh, made a communication on Anamite images and inscriptions.—Captain Bernard forwarded from Algeria a map of the itinerary (for caravans), which was traced in 1883, to connect Mزاب with the oasis of Uargla. This map was executed by him upon a survey made in the course of a military mission in which he had been engaged. Three reports on South Algeria were received, through the Governor-General of Algeria, from the Commander of the 19th Army Corps.—M. L. Guiral sent a communication on the second journey he had completed on the Upper San Benito River.—The Chairman announced the return to France of M. d'Abbadie and M. H. Duveyrier.—Dr. Hamy presented, on behalf of M. H. Rivière, a biographical sketch of the late Dr. Crevaux.—M. de Lastalot, Vice-Consul of France at Jeddah, who was present at the meeting, gave an account of the assassination of M. Ch. Huber.†—A communication was made by M. G. Démanche, on the half-breeds of North-west Canada, and the late insurrection under Kiel.

— July 17th, 1885: M. ALPH. MILNE-EDWARDS in the Chair.—The Minister for Naval and Colonial Affairs sent a copy of two reports (dated December 1st and 10th, 1884) which had been addressed to him by the chief French Resident at Hué and General Brière de L'Isle, on the agricultural, commercial, and industrial condition of Tong-King.—A paper was read by M. Viret d'Aoust on aerial formations of soil.‡—M. Hangsen-Blangsted communicated some statistics on the population of Iceland, based on the Census returns of 1880, recently published.—M. J. Martin, in

* 'Proceedings B.G.S.,' Aug. 1885, p. 542.

† Ibid., Dec. 1885, *ante*, p. 816.

‡ Ibid., Sept. 1885, p. 614.

a letter dated June 11th, from Port Said, announced his return from his long journey in Eastern Siberia, which had occupied more than three years. He was then going to start for St. Petersburg, in order to give an account of his mission in the mines of Siberia. A *résumé* of his journey would be found in the Japan 'Echo,' which gave a report of a meeting at which M. Martin had read a paper.—M. Romanet du Caillaud addressed a communication on Câm-Lô (Anam), the fortress in which Prince Thuyê: recently took refuge. Câm-Lô is in the province of Quang-Tri, being a day's march distant from the town of the same name, which is situated about 43 miles north-west of Hué, and is accessible by the sea. The bar once crossed, gunboats of small draught can navigate the river Da-Hân, which flows past Quang-Tri; the small river on which Câm-Lô stands being an affluent of the Da-Hân. These small rivers are the *locale* of a very considerable commercial movement. They are navigated by large flat-bottomed boats, which in case of warlike operations could be utilised for carrying supplies.—M. A. du Paty de Clam sent from De Bel Abbes a new work on the proposed inland sea, which is a reply to an obituary notice of Colonel Roudaire, published in a geographical review.—Dr. Rouire announced his return from Tunis, and gave a summary of the results of his mission, the details of which he would shortly communicate to the Society. Dr. Rouire had utilised his stay of a few days in Tunis by starting a geographical society in the town, which he hoped would soon rival the societies already existing in Algeria.—M. A. Marchand intimated that he was shortly going to start for the West Coast of Africa, to penetrate into the unknown parts of the regions bordering on the Niger, Benin, and Yoruba rivers, with the view of making a thorough exploration of the country. He intended also to study the commercial resources which these countries offered to French trade.—M. Carlos de Herrera, lieutenant in the Chilian Navy, transmitted an extract from a paper containing the report addressed by him to the Naval Minister of Chili on his exploration of the Rio Palena and the Fallos Canal.—The Chairman congratulated M. Grandidier, one of the oldest and most zealous members of the Central Commission, on having been elected by the Academy of Sciences as a member of its Geographical Section. He also announced the return to France of M. Chaffanjon from his explorations on the Orinoco; he said the traveller had added materially to our knowledge of the geography, natural history, and archaeology of the districts bordering on the river.—Colonel Venukoff presented a map of South-east Siberia, showing particularly the province situated on the shore of the sea of Japan. Referring to this map, M. Venukoff mentioned an interesting fact. The Chinese were generally supposed to be desirous of permanently occupying those parts of Siberia; it appears, however, that on the contrary they willingly retire when colonists arrive, and a civil government established.—Dr. Hamy presented the first volume of an important work on the historical and archaeological researches commenced by the Scientific Commission of Mexico.—M. Romand asked the Society to send a request to the Government that the general in command at Hué should be instructed to collect as many ancient Chinese manuscripts and books as possible, as these documents would throw great light on the history of the Khmers and other races. The Chairman replied that the request of M. Romand should be brought before the next meeting of the Central Commission.—M. Ferdinand de Lesseps made some observations on the progress of the works at Port Roudaire, and announced the discovery of an artesian well in Tunis.—M. G. Demanche called attention to the inauguration of a line of steamers between Havre and Canada.—In conclusion, M. Delaplanche, civil engineer, gave an account of his journey in Persia, illustrated by photographs projected by oxy-hydrogen light.—The Chairman declared the present session of the Society at an end, and announced that the first meeting after the recess would be held on November 6th.

NEW GEOGRAPHICAL PUBLICATIONS.

(By J. SCOTT KELLIE, *Librarian R.G.S.*)

EUROPE.

Oruete y Duarte, Domingo de.—Informe sobre los Terremotos ocurridos en el sud de España en Diciembre de 1884 y Enero de 1885. Malaga, Tip. y Lit. de Fausto Muñoz, 1885: imp. 8vo., pp. 52.

Señor Oruete y Duarte is an alumnus of the Spanish School of Mines, and from his own observations at Malaga when these terrible earthquakes occurred about a year ago, and the observations of others, he has put together in this volume information which will be of value to seismologists and physical geographers. After an orographical and geological description of the region affected, the author gives details of the occurrences in each district, and concludes with a discussion of the phenomenon with a view to discover their causes. A valuable feature of the work is a series of 22 fine photographs showing the results of the earthquakes at various places. There is also a map (scale 1:400,000) showing the superficial distribution of the intensity of the seismic movement of December 25, 1884. The work is published by the Malaga Society of Physical and Natural Science, by whom a copy has been presented to the Society.

Tennant, Robert.—Sardinia and its Resources. Royal 8vo., pp. 318. Roma, Libreria Spithöver; London, Stanford, 1885. Price 12s. 6d.

This book is a good illustration of the fact that some countries nearer home are as much in need of exploration as Central Africa. To most readers Mr. Tennant's most instructive and interesting volume will have more of novelty than a new narrative of Arctic exploration. He had been entrusted with a commission in connection with commercial enterprises in Sardinia, which necessitated a residence in the island of some months' duration. In the discharge of his duty he had to penetrate all parts of the country; he was brought into direct personal communication with the provincial and communal authorities and principal landowners and merchants, and in almost every district the public records and official statistics had to be consulted. In this and other ways the author had the best possible opportunities for obtaining authentic information as to the various resources of the country, its agriculture, mines, forests, fisheries, railways, manufactures, and general commerce. He had also opportunities of mixing freely among all classes of the people, who form a very curious study both from the ethnological and the social points of view. In this way Mr. Tennant collected much original material which he has put together into a readable volume, supplementing it by information on history, geology, and other points, from Italian sources. The first two chapters of the book are mainly historical. A chapter is devoted to geology, physical geography, and climate. The chapter on antiquities is of much interest, for, not to speak of prehistoric peoples, Sardinia has been overrun or dominated at various periods by a variety of peoples—Phœnicians, Latins, Italians, Spanish, and these have all left their traces on the face of the island and on the physiognomy, dress, language, and customs of the people. The chapter relating to the people, their several conditions, customs, religion, and superstitions, their houses, dress, implements, diet, &c., are of special interest. A courting couple are allowed only to speak to each other on rare occasions by means of the finger language. Land laws and customs, agriculture, forestry, mining, industries, railways, all have ample notice. Sportsmen will find a chapter devoted to their interests. Several of the towns and institutions are described in detail. The book, in short, is a very complete account of the island, a trustworthy book of reference, and useful as a guide to any one desirous of spending a novel and interesting holiday. There are several very useful illustrations, and a map on the scale of 20 miles to an inch. The book is

awkward in size and contains several misprints, probably due to the fact of its being printed in Rome. It might be well to have the next edition printed in England in a handier form. Geological time seems to prevail in Sardinia; Mr. Tennant tells us it "has had a checkered career and troubled history extending over hundreds of centuries." Again, for the same cosmical period the cork tree, he tells us, lives after its bark is stripped off.

ASIA.

Hatton, Frank.—North Borneo: Explorations and Adventures on the Equator. With Biographical Sketch and Notes by Joseph Hatton, and preface by Sir Walter Medhurst. Illustrated. London, Sampson Low & Co., 1885: 8vo., pp. xiv. and 342. Price 18s.

It is evident from this volume that the sad and premature death of Frank Hatton was a serious loss, not only to the British North Borneo Company, but to the cause of exploration. Young as he was, he had done much good work, and promised more. He was well qualified for scientific exploration. He had been a successful student of the School of Mines, and took pains to qualify himself for observational work before leaving for his post in Borneo. Mr. Hatton has collected into the volume such notes as have reached him of the exploring work done by his son during his short residence in North Borneo. From them it is evident he had traversed a very considerable tract of the country, and the information given is a contribution of real value to a knowledge of its geography. Frank Hatton was a good observer; he knew what to look for, and his diaries embrace a wide variety of subjects: topography, geology, natural history, people. The chief aim of some of his journeys was to find minerals, and this, of course, required him to make a minute examination of the ground. His journeys took him into the heart of the Company's territory; he traced several of the most important streams, was able to lay down with accuracy some of the leading physical features, and made constant use of his barometer to obtain altitudes. Mr. Hatton, who of course knew his son best, speaks of him with unmeasured admiration and confidence in his future greatness had he not been prematurely cut off. There is a good portrait of Frank, and many attractive illustrations. There is also a good map of N. Borneo on the scale of 20 miles to an inch.

Journal of the Straits Branch of the Royal Asiatic Society, December 1884. 8vo., pp. xx. and 275-343 and 445-7. Singapore, printed at the Government Printing Office, 1885. (*Trübner*.)

The most interesting geographical contribution to this number is the Rev. J. E. Tenison-Woods' account of his journey to the summit of Guning Bubu, the most elevated mountain of the coast range of the state of Perak, about 5600 feet high. Mr. Woods gives many notes of the vegetation met with at various stages of the ascent, and speaks with unbounded admiration of the view to be obtained from the summit. The Rev. J. Perham continues his interesting notes on the Sea Dyak religion. The Hon. W. E. Maxwell gives a continuation of a previous paper on the history of Perak from native sources. Mr. Gueritz's paper on British North Borneo read at the British Association at Montreal is reproduced, while Mr. O'Brien has some curious notes on Jelebu. Accompanying the number is No. 1 of "Notes and Queries" (pp. 27), edited by the Honorary Secretary.

Ocherki Severo-Zapadnoi Mongolii. Resultati puteshestviya popolnennago v 1879-1880 godakh po porucheniyu Imperatorskago Russkago Geographicheskago Obschestva chlenom-sotrudnikom onago G. N. Potaninym. Vypusk III. St. Petersburg, 1883, with map, four plates of illustrations, and index, pp. 372, xx.

This is the third part of M. Potanin's report on his travels in North-western Mongolia in 1879-80. It contains his diary kept from day to day, and supplementary materials of general geographical interest. The route described passes through a region of large lakes which receive the drainage of the mountain ranges of Tannu-ola, Altai, Sailingem, and Sayan, on the confines of Russia and China. The chief towns in this country are Kobelo and Uliassutai, made known to us through the travels of Mr. Ney Eliaz. The supplementary matter in the

volume before us comprises a topographical description of the route travelled in 1879 by Staff-Captain Orlof; analysis of the water in lakes Ubsa, Kirghiz-nor, and Dzoren-nor, by A. Shamarin; results of barometrical observations, by K. Scharnhorst; heights ascertained in Northern Mongolia, by S. T. Miroshnikchenko; lists of birds collected by Adrianof; articles on the fish collected in North-western Mongolia by this and former expeditions, by S. Hertsenstein; on lizards and serpents, lepidoptera, crayfish, and molluscs, by various specialists. Lastly, notices on Northern Mongolia, translated from the Chinese by V. Vassilief the well-known Sinologist, form an appropriate commentary on Potanin's work, and lend additional interest to it.—[E. D. M.]

Smith, George [LL.D., C.I.E.]—The Life of William Carey, D.D., Shoemaker and Missionary, Professor of Sanskrit, Bengali, and Marathi, in the College of Fort William, Calcutta. Portrait and illustrations. London, John Murray, 1835: 8vo., pp. xiv. and 463. Price 16s.

The life of this remarkable man, who certainly had a real influence on the progress of India, has been written more than once already; but we have nothing so complete and appreciative as this interesting and instructive volume by Dr. George Smith, whose long residence in India, and knowledge of its recent history, well qualifies him to act as the great missionary's biographer.

AMERICA.

Moberley, Walter [C.E.]—The Rocks and Rivers of British Columbia. London, printed by H. Blacklock & Co., 1885: 8vo., pp. 104.

Mr. Moberley was formerly Surveyor-General of British Columbia and Dominion Government Engineer-in-Charge of "Exploratory Surveys" of the Rocky Mountain district of the Canada Pacific Railway. This little volume contains brief notes of the numerous journeys which he made through British Columbia and the Canadian North-west during the prosecution of his work, and extend from 1858 to 1878. There are several illustrations, and a map of British Columbia on the scale of 40 miles to an inch.

AUSTRALASIA.

Tregear, Edward.—The Aryan Maori. Wellington, G. Didsbury, 1885: 8vo., p. 107.

Fenton, Francis Dart.—Suggestions for a history of the Origin and Migrations of the Maori People. Auckland, H. Brett, 1885: 8vo., pp. 24 and 130. Price 5s.

Mr. Tregear believes he has hit upon a discovery that will revolutionise ethnology, and he is confident that every one who carefully reads his book will share his convictions, "however incredulous he may be at the outset." The assertions he attempts to prove are: "Positively, 1. That the Maori is an Aryan. 2. That his language and traditions prove him to be the descendant of a pastoral people, afterwards warlike and migratory. 3. That his language has preserved, in an almost inconceivable purity, the speech of his Aryan forefathers, and compared with which the Greek and Latin tongues are mere corruptions. 4. That his language has embalmed the memory of animals, implements, &c., the actual sight of which has been lost to the Maori for centuries. Probably, 1. That he left India about 4000 years ago. 2. That he has been in New Zealand almost as long as that time." When we state that Mr. Tregear rests his case on ingenious word-comparisons and fancied resemblances among myths, ethnologists will surmise that his reasoning is somewhat of the Monmouth-Macedon type. Mr. Tregear does not seem to be acquainted with Mr. Keane's ethnological appendix to Mr. A. R. Wallace's 'Australasia,' else he would have seen that others before him were convinced that in the Pacific races there must be a large infusion of Caucasian blood. The value of Mr. Tregear's reasoning on the basis of language may be inferred by the scientific ethnologist from the following

specimens:—The Sanskrit *pa*, to protect, is connected with Maori *pa*, a fortified town, *papa*, a father, and then with Greek *pagos*, a hill, Latin *pagus*, a village, Hindu *pur*, a town, *pahar*, a hill. Sanskrit *dhu*, to shake; Maori *ru*, to rumble. Sanskrit *var*, to cover, clothe; Maori *whare*, a house. Sanskrit *do*, to cut; Maori *ro*, as in *haro*, to chop smooth, *hāro*, a landslip. Then Mr. Tregear sets himself to discover reminiscences of the Maori's former acquaintance with certain animals to which they were strangers in New Zealand, until introduced by the English. He finds a Sanskrit word *bheki*, the frog, existing in Maori *peke*, leaping over, *peki*, chirping or twittering, &c. He finds Sanskrit *gau*, cow, and *gē*, the earth, come from the same root, and finds the former in Maori *kahui*, a herd, *kahurangi*, unsettled ("sky-cow," moving about like clouds), *kahupapa*, a bridge (a bridge was "a flat cow" on which he crossed streams). The Latin *taurus* is treated in the same perversely ingenious manner, e. g. Maori *tararau*, he made a loud noise; so *bos* is found surviving in *pohaha*, he ripped up. These examples will probably suffice to indicate the character of Mr. Tregear's book.

Mr. Fenton, who was formerly a chief judge of the Native Lands Court of New Zealand, is less ambitious than Mr. Tregear. His suggestions as to the wanderings of the Maori race deserve attention, though he also finds fancied resemblances between Maori words and English, Latin, Greek, Egyptian, Akkadian, and Hebrew.

OCEANIA.

Gill, W. Wyatt.—Jottings from the Pacific. With sixteen illustrations. London, Religious Tract Society, 1885: 8vo., pp. 248. Price 5s.

These "jottings" are some of the results of Mr. Gill's observations during his many years' residence in the Pacific. They are divided into three parts. Under the first part, "Days from Home," Mr. Gill gives us notes of his visits to several islands; Mutao, a little coral island 750 miles north-west of Samoa; Nanomango, 30 miles west of Mutao; Nassau, "a complete coral island, just a mile and a half in length, and about 50 feet above the ocean level;" Palmerston Island, another low coral island, the westernmost of the Hervey group; Atiu, famous for its limestone caverns; Mauke, 55 miles from Atiu. While not neglecting his functions as a missionary, Mr. Gill was able to make many useful observations, during these visits, on the people and natural history of the islands, and collect specimens of their folk-lore. The second part of the book is entitled "Bible Truths illustrated by Native Preachers," and contains some very curious reading. Under Part III., "Zoological and Botanical Notes," we have a good deal of information of scientific value. Among other things he mentions the first visit of a fur-seal to the island of Mangaia; the natives had no name for the animal, "proving that it had not previously been seen in the island." Another very curious circumstance mentioned is the disappearance of land-birds from Raratonga. Thirty-two years ago the woods "were everywhere vocal with the song of birds." Their disappearance is partly due to the gun in the hands of wanton lads, but mainly to the cats introduced by the missionaries. For a long time the cat was a real blessing, by keeping down the small indigenous rat. But rats becoming scarce, the cats took to hunting birds, with the result that in Raratonga and in other islands, several species have been entirely exterminated. The cats, however, according to Mr. Gill, have been greatly aided by cyclones. There are many other jottings in this section which will interest the naturalist. Under Part IV., "Miscellanea," we have many instructive notes. Lady Brassey, in her 'Voyage of the *Sunbeam*,' states that "islands occasionally disappear in these parts, and refers especially to the disappearance of a little island off Raratonga, with two missionaries on it." "There is not a word of truth in the story," Mr. Gill states, nor has he, during a residence of thirty years, ever heard of the disappearance of a single island. The illustrations are attractive and instructive; but there ought to have been a map of the region embraced in the book.

Murray, [Rev.] Thos. Boyles.—Pitcairn: the Island, the People, and the Pastor. To which is added a short notice of the original settlement and present condition

of Norfolk Island. Revised and brought up to date by the Rev. C. C. Elcum, M.A. 8vo., pp. xvi. and 368.

It is thirty years since the first edition of this book was issued, and notwithstanding its scrappiness and archaic style, was of considerable interest. In the present edition, Mr. Elcum has removed a good many redundances and repetitions, and brought the strange story of the descendants of the *Bounty* mutineers down to the present date. There are a good many illustrations, but there ought also to have been maps of Pitcairn and Norfolk Islands.

The following works have also been added to the Library :

Keane, [Prof.] A. H.—The Lapps: their Origin, Affinities, Habits, and Customs [reprinted from the Journal of the Anthropological Institute, November, 1885.] London, E. Stanford, 1885: 8vo., pp. 23. Price 2s.

Hartley, [Sir] Charles A.—Inland Navigations in Europe. Being one of the Series of Lectures delivered at the Institution of Civil Engineers. Session 1884–85. London, published by the Institution, 1885, 8vo., maps, pp. 62.

Begg, Alexander.—The Great Canadian North-West: its Past History, Present Condition, and Glorious Prospects. Montreal, printed by John Lovell & Son, 1881: 8vo.

Hargrave, Joseph James.—Red River. Montreal, printed by John Lovell, 1871: 8vo., pp. 506.

Rodenbough, T. F.—Afghanistan and the Anglo-Russian Dispute. An account of Russia's advance toward India, based upon the Reports and Experiences of Russian, German, and British Officers and Travellers; with a description of Afghanistan and of the Military Resources of the Powers concerned. New York and London, G. P. Putnam's Sons, 1885: cr. 8vo., maps and illustrations, pp. 139.

[The 'Challenger' Expedition.]—Report on the Scientific Results of the voyage of H.M.S. 'Challenger,' during the years 1873–76, under the command of Capt. George S. Nares, R.N., F.R.S., and the late Capt. Frank Tourle Thomson, R.N. Prepared under the superintendence of the late Sir C. Wyville Thomson, Knt., F.R.S., &c., and now of John Murray, one of the Naturalists of the Expedition. Zoology.—Vols. XII. and XIII. Published by order of Her Majesty's Government. London, Longmans & Co., &c., 1885: 4to., pp. (Vol. XII.) xxxvi. & 554: (Vol. XIII.) viii., 341, 24 & 228, chart and plates. Price (Vol. XII.) 60s. (Vol. XIII.) 50s.

In continuation of the series, Vol. XII. is wholly occupied by a Report on the Annelida Polychæta, collected by H.M.S. 'Challenger,' during the years 1873–76. By William C. McIntosh, M.D., &c.

Vol. XIII. contains—I. Report on the Lamellibranchiata collected by H.M.S. 'Challenger,' during the years 1873–76. By Edgar A. Smith, F.Z.S. II. Report on the Gephyrea, collected, &c. By Dr. Emil Selenka. III. Report on the Schizopoda, collected, &c. By Prof. G. O. Sars.

Heylyn, Peter.—Cosmography in Four Books. Containing the Chorography and History of the whole World: and all the Principal Kingdoms, Provinces, Seas, and the Isles thereof. With an Accurate and an Approved Index of all the Kingdoms, Provinces, Countries, Inhabitants, People, Cities, Mountains, Rivers, Seas, Islands, Forts, Bays, Capes, Forests, &c., of any Remarque in the whole World: Much wanted and desired in the former, and now annexed to this last Impression, Revised and Corrected by the Author himself immediately before his death. London, 1682: folio, maps.

[United States and Canada.]—The Englishman's Guide Book to the United States and Canada. Illustrated. With an Appendix of the Shooting and Fishing Resorts of North America. Edition of 1885. London, Sampson Low & Co., and E. Stanford: New York, G. P. Putnam's Sons: 12mo., pp. ix., 300, 68.

This edition has been thoroughly revised and corrected to date, and contains 24 pages in excess of that of 1884. The volume is illustrated by 22 maps and plans of cities, besides 17 whole-page illustrations of scenery, &c.

NEW MAPS.

(By J. COLES, *Map Curator* B.G.S.)

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Bulgarien, Rumelien und Macedonien.—Generalkarte von —, von A. Steinhauser. Scale 1:864,000 or 11·8 geographical miles to an inch. Wien, Artaria & Co. Price 3s. (*Dulau.*)

France.—Carte de —, dressée par le Service Vicinal par ordre de M. le Ministre de l'Intérieur. Scale 1:100,000 or 1·3 geographical miles to an inch. Paris, 1885. Sheets:—XI.-25, St. Jean-d'Angély; XII.-26, Angoulême; XV.-21, Châteauroux; XV.-22, Argenton; XVI.-20, Vierzon; XVII.-20, Bourges; XVIII.-20, la Charité; XIX.-20, St. Saulge; XX.-16, Ervy; XXII.-24, Bourg; XXII.-29, Valence; XXV.-20, Morteau. Price 7d. each. (*Dulau.*)

Gotthardbahnstrecke.—Geologische Uebersichtskarte der —. Kil. 38-149 (Erstfeld-Castione). Dr. F. M. Stapff. Scale 1:25,000 or 2·9 inches to a geographical mile. 10 sheets. Berlin. Price £2 10s. (*Dulau.*)

Servo-Bulgarian War. Maps to illustrate the —, with abstract of the Treaty of Berlin, &c., &c. W. & A. K. Johnston, Edinburgh & London. 1885. Price 1s. coloured.

Südost-Europäischen Halbinsel.—General-Karte der — (Unter-Donau- und Balkan-Länder, Königreich Hellas). Bearbeitet von Heinrich Kiepert. Scale 1:1,500,000 or 20·4 geographical miles to an inch. 3 Blätter. Zweite berichtigte Ausgabe. Berlin, Verlag von Dietrich Reimer. 1885. (*Dulau.*)

This is another edition of Dr. H. Kiepert's excellent map of South-Eastern Europe, published in 1880, with considerable extension to the south; it also contains an additional inset map of the Dardanelles. As this map embraces the country where hostilities exist, and is corrected to date, it will prove useful for reference in all matters concerning the Eastern Question.

Südwest-Deutschland.—Uebersichtskarte von —, von J. L. Algermisen. Scale 1:400,000 or 5·5 geographical miles to an inch. Metz, Lang. Price 3s. (*Dulau.*)

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Index to Indian Atlas, showing sheets published to October 1884. Scale 1 inch to 256 miles. Price 6d.—Index to Trans-Frontier Survey Sheets. March 1885.

Note.—The date given is the date of publication, unless otherwise specified. Only the maps with the prices given are for sale.

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This is the second issue of the Perthes Centenary map of Africa. Accompanying each of these maps is a paper giving the authorities referred to in their compilation, and on inspection of the maps themselves, it will be found that every detail, consistent with their scales, is laid down.

AMERICA.

Argentina.—Mapa del Interior de la Republica —, construido sobre los datos oficiales y sus propias observaciones hechas en los Años 1875–1883. Por el Dr. D. Luis Brackebusch, Catedrático de la Universidad Nacional de Córdoba, 1885. Scale 1 : 1,000,000, or 13·6 geographical miles to an inch. 6 sheets. L. Friederichsen & Co., Hamburg. (*Dulau.*)

This map includes all the country lying between the latitudes 21° 30' S. and 35° S., and between longitude 61° 40' W. of Greenwich and 71° 20' W., thus showing all the northern part of the Republic of Chili, the southern portion of Bolivia, and the central provinces of the Argentine Republic. A good map of this region has long been wanted, and that which is now under consideration gives very full details as to topographical features of the country.

Dr. Luis Brackebusch has been engaged for some time past in surveying operations in the Argentine Republic, the results of which, in combination with the data previously in the hands of the Government, have enabled him to produce a map of the interior of the Republic which, for minuteness of detail, is not surpassed, if equalled, by that of any considerable portion of South America. The hill-work is effective, the writing clear, and the map as a whole is creditable, both to the compiler and lithographer.

Eskimo-Länder.—Die — nördlich der Hudson-Strasse. Zur Übersicht der neuesten Aufnahmen unter Captain Hall, Schwatka, Spicer & Keeney, Boas und Anderen. Scale 1 : 6,000,000, or 82·1 geographical miles to an inch. Petermann's 'Geographische Mitteilungen,' Jahrgang 1885, Tafel 19. Justus Perthes, Gotha. (*Dulau.*)

OCEANIA.

Carolinen, Marschall- und Pelew-Inseln.—Karte der —, mit Detailplänen der Inseln Yap, Ponapis, Kusaie, etc., von Gustav Freytag. Equatorial scale 1 : 5,200,000, or 71·2 geographical miles to an inch. Wien, Druck und Verlag von G. Freytag. Price 1s. 6d. (*Dulau.*)

In addition to the general map of these groups there are inset maps, on an enlarged scale, of twelve of the principal islands and atolls. In the southern part of the map a portion of New Guinea, and some of the Admiralty Islands, are shown.

Melbourne.—Map showing the site of — and the position of the huts and buildings previous to the foundation of the Township by Sir Richard Bourke, in 1837. Surveyed and drawn by Robert Russell. Scale eight inches to a mile. Fac-simile.

CHARTS.

Admiralty.—Charts and Plans published by the Hydrographic Department, Admiralty, in September and October 1885.

No.	Inches.	
K	..	Japan islands, Korea, and Manchuria (Index chart). Price 6d.
L	..	Islands in the Pacific Ocean (Index Chart). Price 6d.
N	..	South America (Index Chart).
P	..	East Coast of North America from Labrador to Florida (Index chart).
1161	m = 3·2	Wales, south coast:—Swansea bay. Price 2s. 6d.
1483	m = 3·5	Adriatic sea:—Ports Malamocco and S. Nicolo del Lido with the channels leading to Venice (plan, port Chioggia). Price 2s. 6d.
903	..	North America, east coast:—Gouldsborough bay to Little Spoon island, including Mount Desert island. Price 2s. 6d.
2471	m = 3·5	North America, east coast:—New London harbour. Price 1s.
530	..	Victoria to Santa Catharina:—Plan added. Macabi anchorages.
1323	..	Independencia bay to Begueta bay:—New plan. Ancon bay and adjacent islands.
2148	..	Central America, west coast:—New plan. Libertad anchorage.
754	m = { 1·8 3·0 }	Bay of Bengal, Orissa coast:—Dhámrá river. Price 2s. 6d.
2405	Kuril islands:—Plans added. Bettobu anchorage. Thana anchorage.	
1033	Champion bay to cape Naturaliste:—Plan added. Approaches to port Don-gara or Denison.	
1034	New Guinea:—Plan added. Finsch harbour.	
656	Anchorage in Solomon islands:—Plan added. Southern approach to Hathorn sound.	
731	Gilbert islands:—Plans added. South passage. Peacock and Espiegle anchorages.	

(J. D. Potter, agent.)

CHARTS CANCELLED.

No.		Cancelled by	No.
L	Index chart	Index chart	K
P	Index chart	Index chart	L
K	Index chart	Index chart	N
N	Index chart	Index chart	P
1161	Swansea and Neath	New plan, Swansea bay	1161
1483	Porto di Malamocco and channels to Venice	{ New plan, Ports Malamocco and S. Nicolo del Lido, with the channels leading to Venice	1483
2471	New London harbour	New plan, New London harbour	2471
754	Entrance to Dumrah river	New plan, Dhámrá river	754
116	Balta sound.		
14	Plans on this sheet, Trinkitat harbour, Sawákin harbour.		

CHARTS THAT HAVE RECEIVED IMPORTANT CORRECTIONS.

No. 1630. England, east coast :—Orfordness to Cromer. 1543. England, east coast :—Yarmouth and Lowestoft roads. 2397*a*. Scotland, north and east coasts :—Southern sheet. 1471. Ireland, east coast :—Kingstown harbour. 2308. Norway, west coast :—Brand fiord to Lekö. 2309. Norway, west coast :—Lekö to Donnæsö. 438. France, north coast :—Boulogne. 2846. France, west coast :—Bourgneuf to Ile de Groix. 2060*b*. North Atlantic ocean :—Western portion. 2895. North America, east coast :—Rockport harbour. 853. North America, east coast :—St. Andrew sound to St. John river. 2806. North America, east coast :—Charleston harbour. 852. North America, east coast :—Sapelo sound to St. Andrew sound. 2863. North America, east coast :—Cape Fear river. 331. North America, east coast :—Wassaw, Ossabaw, St. Catherine's and Sapelo sounds. 2860. North America, east coast :—Savannah river to St. Helena sound. 2861. North America, east coast :—St. Helena sound to Charleston harbour. 6*b*. Indian ocean :—Gulf of Aden, western sheet. 1353. Malacca Strait :—Diamond head to North sands. 793*b*. Malacca Strait :—Pulo Penang to Parcelor hill. 933. Java, north coast :—Batavia road. 943. Eastern archipelago :—Philippine islands. 2575. Eastern archipelago :—Celebes sea, eastern part. 875. China :—Ports and anchorages in Tong King gulf. 2661*a*. China sea :—Southern portion. 1056. Australia, west coast :—Cape Cuvier to Champion bay. 1020. Australia, east coast :—Bucroft head to Port Jackson. 2350. Australia, east coast :—Double point to Cape Tribulation. 214. South Pacific ocean :—Solomon islands. (*J. D. Potter, agent.*)

United States Charts.—No. 963. North Polar Regions. Chart of the Arctic Ocean. Compiled from the latest information, 1885. Price 2*s*. 1*d*. — No. 976. North-west Coast of Peru. Harbor of Payta. 1835. Price 1*s*. — Pilot Chart of the North Atlantic Ocean. November 1885. U.S. Hydrographic Office, Washington, D.C.

ATLASES.

Schweiz.—Topographischer Atlas der — im Masstab der Original-Aufnahmen nach dem Bundesgesetze vom 18 Dezember 1868 durch das eidgenössische Stabsbureau unter der Direktion von Oberst Siegfried veröffentlicht. XXVII. Lieferung : No. 50, Ermatingen. 51, Tägerwil. 60, Hugelshofen. 61, Güttingen. 61*bis*, Uttwil. 62, Weinfelden. 64, Romanshorn. 78, Rorschach. 83, Locle. 84, Cerneux-Péquignot. 147, Läufelfingen. 309, Neuchâtel.

XXVIII. Lieferung : Nr. 11, Staufenberg. 45, Thaingen. 46, Ramsen. 47, Diessenhofen. 49, Steckborn. 97, Bretzwil. 167, Kulm. 168, Reiden. 194, Dürrenroth. 196, Sumiswald. 281, Travers. 347, La Roche. Price 13*s*. each part. (*Dulau.*)

Cortembert, E.—Nouvel Atlas de Géographie ancienne, du moyen age et moderne, contenant 100 cartes. Nouvelle édition entièrement refondue. Paris, Hachette et Cie. Price 13*s*. (*Dulau.*)

EDUCATIONAL.

Géographie Contemporaine.—Atlas de —, composé de 51 Cartes et Cartons a l'usage de l'enseignement par J. Du Fief. Bruxelles, Institut National de Géographie. Price 5*s*. (*Dulau.*)

This is a very rough production ; it however contains much useful information, and its price is remarkably low.

India.—Map of —, constructed and published by W. & A. K. Johnston. Edinburgh & London. Scale 1 : 4,700,000 or 64·3 geographical miles to an inch.

This map, which is produced in a bold style, is intended to accompany and illustrate one of the series of Handbooks which W. & A. K. Johnston are publishing, and which will ultimately comprise all countries of importance. Each of these Handbooks consists of thirty-two pages, containing a *résumé* of the physical, political, and commercial geography of the country under consideration. None but the names referred to in the accompanying text are given in this map, which therefore has the advantage of not being overcrowded with lettering.

Oceania.—Colonial Atlas of —, containing thirteen full-coloured maps:—Oceania, Australia, Victoria, New South Wales, Queensland, South Australia, Western Australia, Tasmania, New Guinea, New Caledonia, Fiji, New Zealand N. Island, New Zealand S. Island. W. & A. K. Johnston, Edinburgh, and London, 1886.

This Atlas appears to have been published for the use of schools in the Australian Colonies, and New Zealand, and seems to be well suited for that purpose; it would, however, have been far better to give the real date of publication, than to date it for the year following, as this can only tend to mislead.





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